

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2580.—VOL. LV.

LONDON, SATURDAY, JANUARY 31, 1885.

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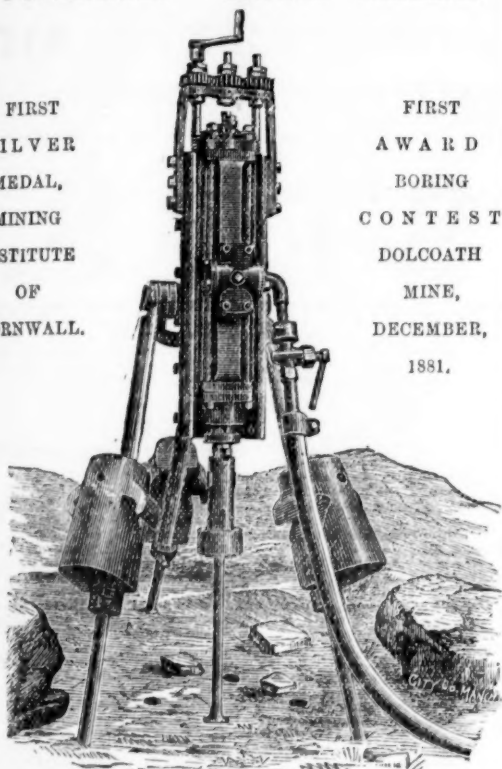
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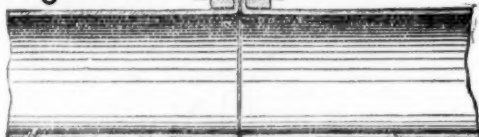
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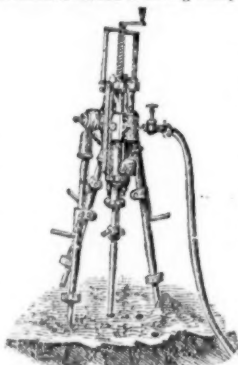
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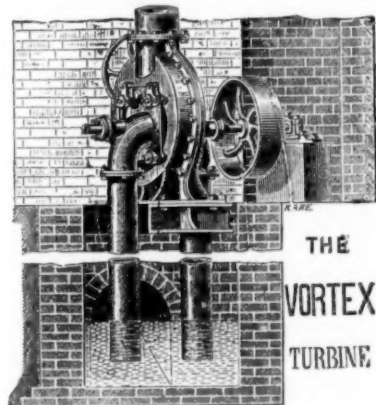
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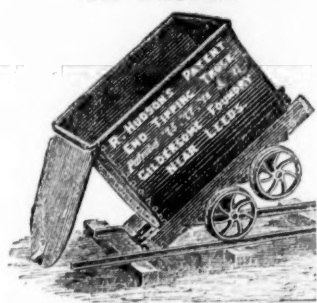
UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the **LIGHTEST, STRONGEST**, and most **CAPACIOUS** made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

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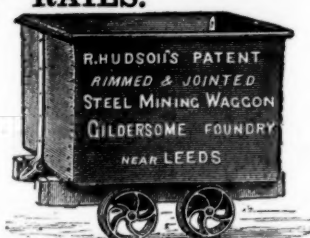
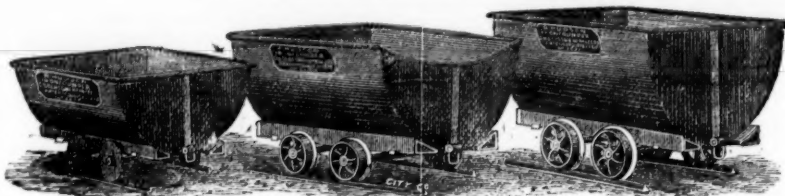
N.B.:—The American, Australian, Indian, and Spanish Patents on Sale.

CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

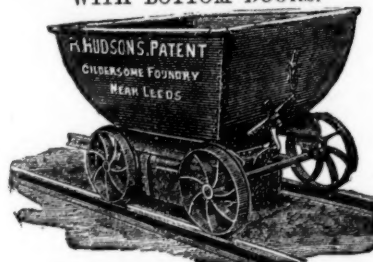
1.—PATENT STEEL END TIP WAGONS.



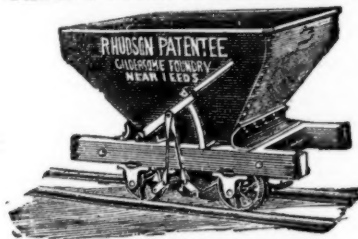
7.—PATENT STEEL MINING WAGONS.



12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.



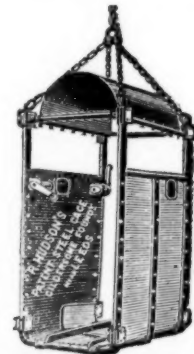
13.—PATENT STEEL HOPPER WAGON.



14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF-ACTING if desired.)



15.—STEEL CAGE.



17.—STEEL SELF-CONTAINED TURNTABLE.

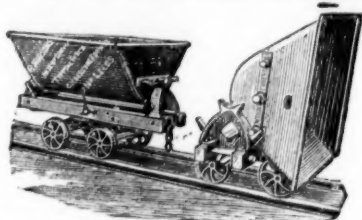


(Also made in Cast Iron for use where weight is not a consideration.)

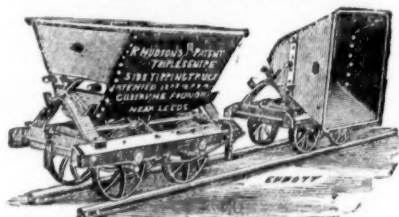
No. 19.—PATENT STEEL CHARGING BARROW, DOUBLE THE STRENGTH & MUCH LIGHTER THAN ORDINARY BARROW



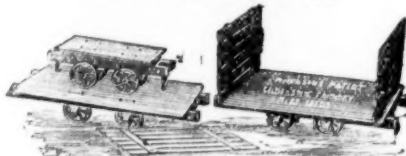
2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



4.—PATENT STEEL PLATFORM OR SUGAR CANE WAGON.

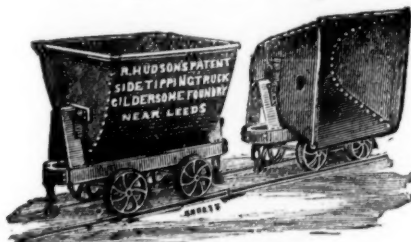


5.—PATENT STEEL CASK.

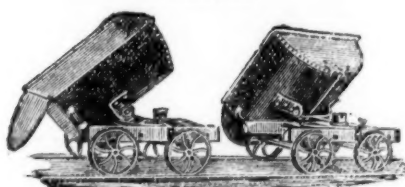
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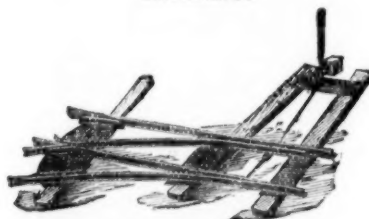
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



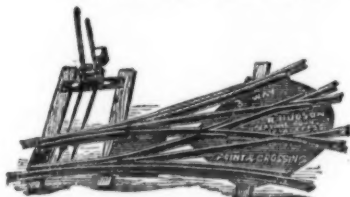
9.—PATENT STEEL ALL-ROUND TIP WAGON.



10.—LEFT-HAND STEEL POINT AND CROSSING.



11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



16.—PATENT STEEL WHEELBARROWS.
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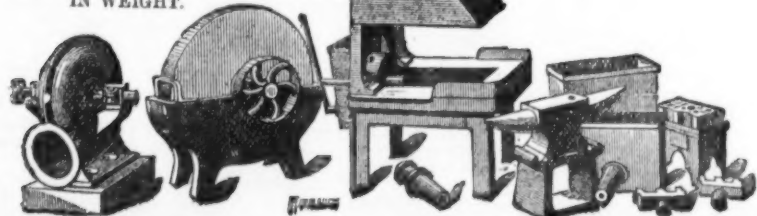
18.—"AERIAL" STEEL WINDING TUB.



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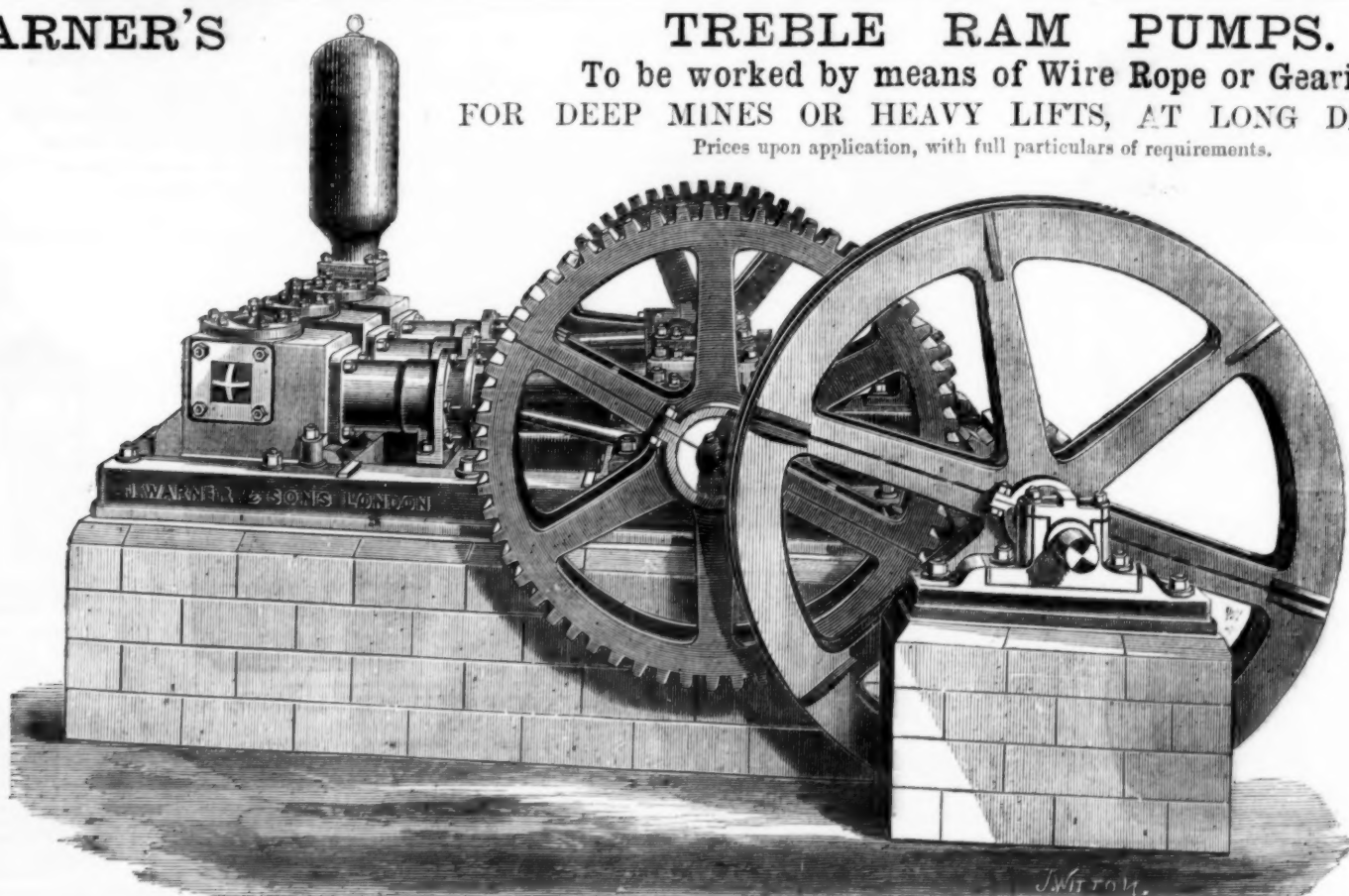


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Original Correspondence.

A CORRECTION.

SIR,—My attention has been called, by a manager of a colliery in which this company's system of coal getting is employed, to a circular issued by the Patent Safety Hydraulic Cartridge Syndicate (Limited) (McNab's system), which is being widely circulated amongst colliery owners and others, accompanied by a circular, offering some shares, with which is an extract from the *Mining Journal*, dated Nov. 22, 1884, stating that the Lime Cartridge has not "realised the great expectations and practical efficiency claimed for it" . . . "and has now entirely lost the confidence of the miners, and has, it is said, been practically abandoned."

I beg to state that not only has this system not been abandoned, but the use of our Lime Cartridges is constantly and increasingly adopted, both in England and on the Continent, and I may also mention that this company received during the last year alone a bronze medal from the Amsterdam Exhibition (1883), a gold medal from the International Health Exhibition—Class 45—and the Society of Arts' gold medal ("Shaw" prize) for the "most deserving exhibit relating to Industrial Hygiene."

My directors trust that you will, in justice to the company, give the same publicity to this letter as to the paragraph to which I have referred.

FRANK M. STILL, Secretary.

The Compressed Lime Cartridge Company (Limited),
(Sebastian Smith and Moore's Patent System.)
2, Queen-street, Cheapside, London, Jan. 29.

THE RATING OF MACHINERY AND PLANT.

SIR,—I was surprised to learn from your report of the proceedings at the hearing of the recent appeal at the Northumberland Quarter Sessions against the rating of machinery and plant connected with the Tyne Boiler-Works, that the learned counsel for the appellants stated that the rating of machinery "was substantially a complete novelty," and added, "it had been done in one or two places, where it had perhaps been acquiesced in." That the learned counsel was greatly in error in making these statements is shown by the fact that it was solemnly decided by the learned judges of the Court of King's Bench, upwards of 100 years ago, that buildings with machinery attached, or appurtenant thereto, must be rated together "as one entire thing," and this principle, with one exception, has been upheld by the judges ever since. In the year 1783, in *Rex v. St. Nicholas, Gloucester*, where a house and weighing-machine or steelyard were rated at 40s., the house itself was worth 5s. per annum, to which sum the Sessions reduced the rate. The Court held that the "house and weighing-machine were 'one entire thing,' and that the steelyard was the most valuable part of the house, which may be said to have been built for the steelyard, and not the steelyard for the house." The Court quashed the order of Sessions, and affirmed the rate at the full amount of 40s. In the year 1787, in *Rex v. Hogg*, where Hogg, the occupier, was rated at 36s. for a building called "the engine-house," it was stated that the engine was not fixed to the floor of the premises, and that the building, without the engine, was worth 2s. 2s. per annum, upon which sum the applicant was willing to be rated. It was objected that the property was distinct in its nature, that the building and engine were not the same, because the former would go to the heir, and the latter to the executor; but the Court held that the objection was immaterial, and that this case came directly within *R. v. St. Nicholas, Gloucester*, and confirmed the rate. The Court followed the principles laid down in the foregoing cases in *Rex v. Birmingham Gas Light Company* (1823), and in *R. v. Brighton Gas Company* (1826). In 1827 the question was raised, for the first time, whether tenants were liable to be rated for the improvements made, and machinery and plant erected or laid down by them, in addition to the rents reserved and payable for the properties. In *Rex v. Attwood* (1827) the Court held that if the tenant of a mine expends money in making it more productive, that it is the same as expending money in improving a farm or a house, in both of which cases the tenant is rateable for the improved value. And in *Rex v. Lord Granville* (1829) the appellant was lessee and occupier of a coal mine or colliery, and had erected several steam and other engines, which were used solely for draining the mine and raising the coals to the surface, and also laid down a railway, which was solely employed in facilitating the carriage of the coals. The question for the Court was, whether the appellant was liable to be assessed in respect of this machinery in addition to the royalty paid to the landlord? The Court held that the appellant ought to be rated for his engines and railway, and that it was immaterial, so far as rateability was concerned, whether the landlord or the tenant erect an engine or lay down the railway; the bargain between landlord and tenant may be varied on that account, but the occupier was properly rateable in respect of its improved value. In *R. v. Guest* the Court directed that the rate should stand on the general principles laid down—that real property ought to be rated according to its actual value, as arrived at by taking into calculation the value of the machinery attached to it, without considering whether such machinery was real or personal property, so as to be liable to distress or seizure under a writ of *fi. fa.*, or whether it would descend to the heir or executor, or whether, at the expiration of a lease, it would belong to the landlord or the tenant. In *R. v. Birmingham and Staffordshire Gas Light Company* a rate was quashed because it was found that houses to which machinery was attached were not rated according to the increased or improved value arising from the machinery.

And the principles laid down in these "old" cases have been followed in the following subsequent cases—*R. v. Southampton Dock Company*; *R. v. Haslam and Howarth*; *R. v. Overseers of Salford*; *R. v. North Staffordshire Railway Company*; *R. v. Castleton*; *Carter v. Salford*; *Great Western Railway Company v. Melksham Union*; *R. v. Brinjes*; *Guest v. East Dean*; *Kittin v. Liskeard*; *Van Mining Company v. Llanidloes Union*; *R. v. Lee*; and *Laing v. Overseers of Bishopwearmouth*. And since the above decisions the House of Lords, in *Covv v. Bristow* (1876), where the plaintiffs were rated for coal derricks, attached by chain cables to moorings laid down in the bed of the River Thames, and the derricks slightly changed their position daily with the ebb and flow of the tide, and the moorings were removable at a week's notice, confirmed the decision of the Court of Appeal, and held that the plaintiffs were rateable.

The only exception to the rule laid down for rating of machinery and plant in the foregoing cases is *R. v. Halstead* (1867). In this case the Court of Queen's Bench was asked whether certain looms and other machines were rateable. The judges, on the authority of *Hellawell v. Eastwood*, where it was decided by the Court of Exchequer that certain looms, &c., were distrainable for rent, held that the looms were not rateable. But *Hellawell v. Eastwood* is practically overruled by *Holland v. Hodgson*, where the Court of Exchequer Chamber held that looms fixed into the floors by nail, or into beams which had been built into the stone (in a similar manner to the looms in the *Halstead* case), passed to the mortgagee with the realty, and in November last the Court of Appeal held that driving belts, which, although not affixed to the freehold, are an essential part of something which is so affixed, also pass to the mortgagee with the realty (Sheffield and South Yorkshire Permanent Building Society v. Harrison). The decision in the *Halstead* case has never been followed, and is overruled by *Laing v. Overseers of Bishopwearmouth* (1877), during the argument of which the late Lord Chief Justice, referring to the *Halstead* case, said—"I am not quite so sure whether that decision is right." The *Halstead* case is, therefore, no authority. In *Chidley v. West Ham* the Court was asked if certain tanks, refrigerators, mash tuns, pumps, &c., were rateable. The appellants relied upon *R. v. Halstead*, and the judges held the tanks, &c., were not rateable.

But it will be observed that, in both the *Halstead* and *Chidley* cases the Court was asked an abstract question—If certain things

were rateable *per se*? But the Court was not asked in either case whether the things were to be taken into account as enhancing the value of the rateable property, and Mr. Justice Blackburn pointed this fact out in delivering his judgment in the *Chidley* case, and said—"In this case, which is, perhaps, not so stated as to bring out the precise point intended to be, or which might have been raised, the Court is asked if certain things described are liable to be rated." And added, "Now, I am not prepared to say that the various articles described in the present case may not be taken into account as enhancing the value of the premises, but that question is not asked, and we are only to say whether the things are rateable."

It has often been said that the rating of machinery is "judged-made" law; but Parliament has expressly enacted, in the "Valuation of Land and Heritages in Scotland Act," that in estimating the yearly value of lands and heritages for assessment, the expression "lands and heritages" shall extend and include, among other things, "brickworks, ironworks, gasworks, and factories, and all buildings and partments thereof, and all machinery fixed or attached to any lands or heritages."

I think the learned counsel will see that he is not only mistaken as to the novelty of rating machinery, but as to the extent to which it has been adopted.

I have during the last 20 years, with my sons and partner, been engaged in the valuation of properties for assessment, mortgages, and other purposes, in more than half the counties in England and Wales, also in Ireland, Scotland, and the Isle of Man, and whenever we found machinery and plant connected with manufacturing works, we included such machinery and plant in the valuations for assessments to the local rates.

And if the respondent's witnesses had been called (a course that was not considered necessary), and had such evidence been admissible, it would have been proved by gentlemen of great personal experience in valuing properties in different counties in England and Wales that in valuing such works as the Tyne Boiler Works they always included such machinery in their valuations.

But in *Rex v. Miller* "usage" in not rating a certain class of property was urged upon the Court, but disregarded; and in *R. v. Hogg* "usage" was again urged upon the Court in rating machinery, and also disregarded; the Court held "as to usage it ought not to be attended to in construing an Act of Parliament which cannot admit of different interpretations."

If property is legally rateable, it is immaterial whether it has been previously rated. *R. v. Wickham* and *R. v. East London Waterworks Company*.

Where manufacturing works are rated in the manner contended for by the learned counsel, and the machinery not taken into consideration in estimating the annual value of such works, the works are not rated as going concerns, but as manufactories "out of work" (*R. v. Castleton*), or as unoccupied works for sale, *Harter v. Salford*, and as mere warehouses for the machinery, and not at rents which persons would be willing to give for the works to carry on the same trades.

In another letter I will show how in some places machinery has not been rated.—*Sunderland*, Jan. 24. THOS. F. HEDLEY.

SIR,—Very mischievous attempts have been made of late years to extend the practice of the rating of machinery beyond what appears to be contemplated by the law, or consistent with public policy and fair dealing. It is high time that the law should be placed upon a sound and intelligible basis, and I am glad to see that the appellants in the recent Tyne Boiler-Works case intend to pursue the question, if necessary, to the ultimate Court of Appeal, for which they deserve the gratitude and support of the manufacturing interest throughout the country. If necessary—which, however, I do not believe—further legislation should be at once resorted to, to relieve manufacturers from the gross hardship which is sought to be inflicted upon them. In every case it is the "hereditament" only which is rateable. Then of what does the hereditament consist? By way of example, in the case of an ironwork, I conceive that it includes the site, with the buildings and erections thereon, and everything which is built into or otherwise attached to the freehold, so as to form part or parcel of the hereditament itself, but not any machinery, or tools, or chattels which are unattached, or only loosely attached, to the freehold, and easily removable. In the first category would be included the engine-houses, boilers, and boiler seats; steam-engines, driving power, furnaces, the foundations, and bedding of the rolls, hammers, and shears, and other heavy machines; but not the rolls, hammers, shears, and machines themselves, which may be lifted and carried away, nor the shafting and gearing which sets them in motion. These latter form no part of the "hereditament," which alone is rateable, and it would in my view be as unreasonable to rate them, as to value the loose tools used in the process of manufacture. The same principle would apply to vices, lathes, looms, pulleys, driving-bands, &c., which abound in other manufactures. I do not care if it be said that certain decisions have been given which do not appear to harmonise entirely with this view. In most cases the difference will be found more apparent than real, and all decisions are not necessarily sound law, and may be overruled if they can be shown to be inconsistent with the spirit of the Assessment Acts, and contrary to public policy and justice. Moreover, the question has never yet been submitted to the ultimate Court of Appeal.

I maintain, however, that the general tenor of the judgments which have been from time to time given in courts of law, is in conformity with the principle here indicated, which, I think, is in accordance also with common sense and fair dealing. It is true that cases will sometimes occur in which doubts may arise as to whether certain things are sufficiently attached to the freehold to form part of the "hereditaments," but such instances are exceptional, and, with a candid unbiased mind, and an eye firmly fixed on the principle which I have indicated, any valuer may, I think, safely steer his bark through the rocks and shoals of this difficult navigation. Unfortunately one valuer starts with the desire, not to say determination, to extend the rating of machinery to the extreme limit allowed by law, and even, if possible, to strain the law itself in that direction. Another valuer, believing the old practice of rating the steam power only to be correct, errs just as widely in the opposite direction.

"*Incident in Seyllan qui vult vitare Charybdim.*"
I will add, in conclusion, that whenever a *sona fide* doubt exists as to the rateability of any part of the premises the occupier is fairly entitled to the benefit of the doubt. If this question is not satisfactorily settled I fear that many important manufacturers will be driven to foreign countries. WM. FOWLER, F.S.I.
Birmingham, Jan. 26.

TREBARTHA LEMARNE MINE.

SIR,—In view of the renewed interest in English mines which is likely to take place owing to the rise in the price of metals, it may prove of interest to some of your readers to point out a few of the features in the above-named mine, which I believe to be one that will soon be more widely known, and will be remunerative to its adventurers before many months.

Trebartha is in Cornwall, on the east side of the Caradon range of hills, and is in the parish of North Hill; it is an estate belonging to Mr. F. R. Rodd, J.P., and is about 9 miles from Callington and 8 miles from Launceston. The mine is about half a mile north-west of the Hall, and its lodes are partly in the killas and partly in granite. In the reign of Queen Elizabeth the tin streamers worked in the valley of the Lyner, on the Trebartha property, and found the metal in large quantities until they came to a certain point in the valley, beyond which in a northerly direction they found no more tin. They naturally concluded they had come to a lode, and drove east and west (chiefly in the latter direction), and opened up two lodes, and these excavations and old burrows are still to be seen. They mined in open cuttings, and had one or more deep adits, and only stopped their operations when they were drowned out, and when the rock proved too hard for their tools. Since that time one attempt was made to open up the mine, but some children fell into the excavation and were drowned, and the operations were discontinued. A little more than four years ago the present company was started, and has been working continuously ever since, and will I trust continue to flourish for the next half century at least.

Up to the present the adventurers have spent about 6500*l.*, and have confined their workings to the two lodes which the former men operated on. These lodes are—

1.—The Gulley lode, in which there is a small leader of tin, and which at present has only been worked as a big open cutting, and in a small deep adit. Some few tons of black tin have been dressed and sold from the workings of this lode. In the adit it is poor and wide, and only has one well-defined wall, and at present is not being worked.

2.—The Mundic lode is several fathoms north of the Gulley lode, and dips in the opposite direction to it. On this lode there are two shafts, the Rodd and the Kempthorne. The former is the most westerly, and has been sunk 10 fms. to communicate with the deep adit. The latter has been sunk 10 fms. below the adit level, and a level (already 28 fms. long) has been driven west to communicate with Rodd's shaft, which shaft is being sunk to meet the 10 fm. level. Thus the mine is really being developed. The mine is, and will be, entirely worked by the almost unlimited water supply, which the lord (Mr. Rodd) has granted the adventurers on most liberal terms. At present the water turns the water-wheel which works the pumps, the 24 heads of Cornish stamps, and the winding machinery and buddles. At present, I believe, however, that only 12 heads are being worked. There is room for a 50-ft. water-wheel above the present one, and at least two or three 40-ft. ones below it when required. There are, I believe, no arsenic works nearer than Callington; this, of course, is a disadvantage. The Mundic lode in adit has produced several hundreds of tons of mundic ore, which have been turned into about 100 tons of whits. These whits produced some 25 per cent. of crude arsenic, and as assayed contained about 200 tons of black tin and wolfram to the ton of whits; 75 tons of the whits were actually burned, and about 23 tons of crude arsenic has been sold at 6*l.* 12s. 6d. per ton. The burnt whits did not fetch nearly so good a price as they ought to have done, owing to the difficulty of separating the wolfram from the tin. Since the sale, some weeks since, I have been trying to find out if scientific men have not found out a cheap and satisfactory method of separating the wolfram from the tin. My efforts have not been in vain, as last week I had the pleasure of witnessing a very beautiful and practical process patented by that able man, Dr. S. H. Emmens. This method depends on the well-known principles of chemistry and electrolysis, and was thoroughly explained to me by the patentee. It will doubtless be widely known in the mining world before very long. As far as it concerns the Trebartha Mine, I may state that the unlimited water-power can be utilised to drive the necessary dynamo-electric machine for a mere nominal sum of money.

Since the last general meeting the committee have wisely purchased rock-drills, and have ordered an air-compressor (to be worked by the water-wheel). In six months' time from the date the machines are set to work (say in March next) the mine will be thoroughly opened up, and the value of the Mundic lode proved. The company is worked on the Cost-book System.

GEORGE KEMPTHORNE WATTS, A.M.I.C.E.,
Executive Engineer, Public Works Department (India).

Abergeldie, Upperton Road, Eastbourne, Jan. 27.

HUSBAND'S OSCILLATING CYLINDER STAMPS.

SIR,—On the reading of my paper at the Mining Institute in October last it was suggested that the condition of these stamps at the end of 12 months working would prove interesting. That time has certainly not yet expired, but an enquiry affords me the opportunity of saying that since they were started on these mines at the beginning of June last the whole cost of maintenance, apart from the replacement of the worn-out heads and dies, has not amounted to 5*s.*, and I see no sign of the approach of a period when any other material than heads and dies will be required for their maintenance.

In this and every other respect, including the quantity of fuel consumed for a given duty, they are so far superior to the old gravitation kind that further comparisons of the two are absurd.

We are able to stamp 90 tons per day with four heads with ease, and the changing of a head occupies about 10 minutes, as compared with the labour of changing 20 of the old sort, the equivalent in duty of one of ours. The saving in this detail will be appreciated by mine agents.—*Marazion, Cornwall*, Jan. 28. W. DERRY.

LEAD MINING IN THE LAKE DISTRICT.

SIR,—My attention has been drawn to the following paragraph which appeared in your issue of Jan. 17, in a letter under the signature "Skiddaw":—

"At Threlkeld Mine the deeper workings are said to be getting richer both in lead and blende. The output of about 150 tons per month is being maintained, and the fortunate proprietors are receiving good dividends, and are likely to for many years to come."

Permit me to say that there is not one word of truth in the whole paragraph. With "Skiddaw's" remarks upon other mines in the district I have no concern.

ANDREW R. GRAY,
Managing Director, Threlkeld Mining Company (Limited).

Edinburgh, Jan. 27.

NEVADA MINING.

SIR,—It was stated some little time since by an eminent authority—Mr. W. W. Smyth—concerning mining in this State, that it was suffering from depression on account of the improvidence of the people, which is true to some extent, and if it had been added "from the inconsistency of its pretended patrons," would have been more true still. If we regard the term—improvidence—in the light of its appropriate and legitimate significance in respect of mining, the prevailing depression, though not wholly, is largely due to that cause. Improvidence in mining is the greatest bane and obstacle to its more general success. It is, as well as its correlative, one of broad and also of particular significance, and as applied to mining effects most vitally its entire administration, including the fundamental principles upon which its practical proceedings are founded, and on which its good or ill success depends. Nevada mines have yielded enormously. What has become of the proceeds—have they been conserved, or unwittingly, if not wantonly squandered? Some have been conserved, and a great deal ruthlessly dissipated, but in neither case has the development of the hidden, but abounding, wealth of the State been aided or prompted from those sources. The money taken out of the mines has for the most part been taken out to return no more—abstracted and diverted from the State to foster other industries, or expended in extravagant and luxurious living. But what does the past testify and the present augur; opposite and contradictory conclusions may be arrived at, as of all others of undemonstrated verity, according to the views of the respective observers—the knowledge and information possessed by each, and the motives which prompt their expressions. To one personally cognisant of the mode of mining generally pursued in this State, and one whose information has been wholly derived from published statements, very different views and conclusions may be arrived at, relied on, and expressed. That the yield of the mines since their discovery about a quarter of a century since has been something enormous will not be denied by anyone informed on the subject, and the question now is—Was the metalliferous wealth of the State or the major portion of it restricted to those superficial channels and deposits. The miner, the geologist, the natural philosopher would, one and all, form a knowledge of the conditions, emphatically answer "No," whether from the evidence of sense, or the severest inductions of science. The ground in by far the larger number of instances has been merely gone over in quest of superficial deposits, which when found have been vigorously taken hold of and emptied of their contents. The permanent and permanently prolific channels and sources of conventionally boundless wealth still remain, and not in doubtful and enigmatical localities, but localities attested by every evidence and sign which Nature unerringly expresses, and practical experience endorses relative to the presence and proximity of the initial and consecutive channels and sources of the precious and other metals; but because Nature has not done more than loosened the precious treasures from its rock-bound and rock elaborated recesses,

and elevated them to sub-aerial positions, they are disregarded, and an age or generation of time may be allowed to pass before the wisdom of practical and scientific intelligence and knowledge, be permitted to offset the licentiousness of arrogant assumptions, and demonstrate the folly and blindness which they so persistently refused to see. It is improvidence pursued by a vengeance of its own inflicting to so studiously avoid and shun such opportunities, especially when more money is frequently given for a single artificially elaborated device, than would suffice to develop into substantial and permanently productive life a dozen or more of those indubitably valuable properties which I know to exist. Is it that the glamour of loftily-excited expectations, which transcend the limit of reason, ruffled ever and anon by constantly recurring doubt, exerts a fascination which blurs and distorts the mental vision, and leads it to materialise the phantasmagoria of fancy, and invest it with the attributes of absolute organised embodiments? Improvidence has marked and marred the career of mining in this State from its inception to the present time—first, by its "Wild Cat" schemes and subsequent equally irrational mode of procedure. Eastern capitalists and others it would seem embarked in Western mining more for speculative market operations than for operative mining results and showy gladiatorialship was had recourse to. The appointment of retired military officers as superintendents was a *furor* at those times, though what qualifying connection there was supposed to be between military experiences and mining pursuits no one that I am aware of ever attempted to explain, nevertheless it was considered the proper thing to do, and was liberally endorsed by popular patronage. Expensive mill building, supplemented with its concomitant reduction works for converting ores into bullion—which were not known to exist—and *prima facie* into money, was also another fallacy of those times, which testify of the improvidence in excess of providence, extravagant and ruinous expenditure, all of which reacted with summary vividness disastrously to the interests of mining in the State. Still the State survives, and will survive and again flourish when the mania for supersensational creations and endowments shall have passed away, as pass away it will, and the sober realities of fact, sense, and evidence subordinate to reason reassume their proper positions and functions.

ROBERT KNAPP.

June, Nye County, Nevada, Jan. 13.

NORTH MEXICAN MINING COMPANY.

SIR,—In your last issue appears a letter headed "A Compliment," which contains a well-merited commendation of Mr. Anthony Pulbrook, the managing director. I read this gentleman's report most carefully, and I have come to the conclusion that the debenture and shareholders are to be heartily congratulated in having such an excellent gentleman to look after their interests. There is no doubt whatever that they appreciate the services of their thoroughly businesslike managing director. He is the right man in the right place.

A DEBENTURE-HOLDER.

NEWS FROM THE TRANSVAAL.

The Transvaal Advertiser (Dec. 27) says:—We have had the opportunity this week of conversing with a gentleman who has just returned from the auriferous district of Waterberg. As an experienced Australian gold miner, he entertains a high opinion of the country as a gold-bearing district, and is confident that eventually it will turn out a "poor man's diggings." Our informant did not prospect himself, but prosecuted enquiries extensively amongst the people who are already there, and his conclusion from what he saw and heard were decidedly favourable to the new field. It may be hoped that more decided evidence of the richness of the Waterberg gold fields will ere long be made public, as it is very desirable that persons should not "rush" the ground without adequate reason or sufficient preparation. Nothing has done more to discredit the Transvaal gold fields than the injudicious "rushing" which has taken place by persons who have neither personal experience to guide nor pecuniary resources to wait success. That the wary and experienced diggers, as a rule, remain on the ground denounced by the unfortunate tyros as a swindle is pretty clear proof that perseverance is required to ensure good luck. For persons with a little capital to fall back upon, and who will be contented with a moderate return for their labour, the prospect afforded by a large section of the Waterberg being thrown open may prove attractive.

NEW IRON ORE FIELDS IN CANADA.—From Mr. S. J. Ritchie, President of the Central Ontario Railway Company, says the Cleveland Iron Trade Review, we learn that several important discoveries of iron ore deposits have within the past six weeks been made on the property of the syndicate of which he is a member, and very near the line of his railroad. If present appearances are a safe guide, these developments will he assure us prove the richest that have yet been made in Canada. The first and most important find is in the township of Tudor, county of Hastings, Ontario, about 14 miles south of the Coe Hill Mine. The discovery was purely accidental, and came about by the uprooting of several large trees, which falling stripped the surface of the earth for some distance around, exposing what is apparently a very large body of ore. From measurements thus far made it is believed that this vein is fully 60 ft. wide, and of very considerable length. Analyses of specimens taken out show no titanium and no sulphur. This deposit and one other lie within sight of the railroad track. In Lake Township, a short distance west of the railroad, two additional deposits have very recently been discovered, one of them of an ascertained length of 3000 ft. A branch railroad is now being run to the new mines. From analyses made it is stated that the ores yielded 65 per cent. of metallic iron, .02 per cent. of phosphorus, and neither titanium nor sulphur. Work at the Coe Hill Mine has been going steadily forward, the main shaft having reached a depth of about 100 ft. and the ore continually improving in quality. The new hoisting plant has been put in operation, and is working satisfactorily. The apparently narrow vein which was noted as running parallel to the large deposit has, we are informed, been found to be of much larger size than was at first supposed, indicating an aggregate width of the combined veins—should they be found to come together below the intervening granite—of fully 100 ft.

STARTING OF A NEW ROLLING MILL AT DARLINGTON.—A new rolling mill, to enable the Darlington Steel and Iron Company to carry out orders for the heaviest description of work, was started on Saturday evening, in the presence of numerous visitors. The new mill replaces an old-fashioned pull-over mill laid down in the times of ironmaking, which, although able enough for the work it was designed for, was far behindhand in the present day of steelmaking and strong competition. It is intended to uproot the old soaking pits, through which 120,000 tons of ingots have passed—a large proportion of which are rolled off direct into the finished article—and substitute Gjers's soaking pits, which are capable of taking much larger ingots. After the rolling of the first rail the directors of the company entertained their chief officials to dinner, the chair being occupied by Alderman T. Hugh Bell, and the vice-chair by Mr. J. N. White, the general manager.

RAILWAY RATES AND LEGISLATION.—At the annual meeting of the South Wales Chamber of Agriculture, held on Tuesday, at Salisbury, under the presidency of Lord H. Thynne, M.P., a paper "On Railway Rates and Legislation" was read by Mr. J. W. TITT, and the following resolution was passed:—"That this Chamber, having learned that the leading railway companies intend to bring forward Bills in Parliament for altering the existing rates of carriage, desire to express their opinion that any advance in the rates of carriage would be fraught with the most serious consequences to those engaged in the agriculture, trade, and commerce of this country, many of whom are already suffering considerable losses from the low prices at present prevailing, and that the reduction effected of late in the working expenses of the different railways should entitle the agriculture, trade, and commerce of this country to some relief from the high and oppressive railway rates at present prevailing, and the unjust and undue preference given to foreigners."

MANUFACTURERS AND THE POLLUTION OF RIVERS.

HIGH COURT OF JUSTICE: CHANCERY DIVISION.

(Before Mr. Justice PEARSON).

FLETCHER V. BEALEY.

His lordship, on Tuesday, disposed of the motion in this action, in which he reserved judgment in the middle of last month. The action was one in the nature of what used technically to be called a *quia timet* bill in the old time of the Court of Chancery—that is to say, it was brought to restrain the continuance of a course of action which the plaintiff alleged would inevitably do an irreparable injury to his property. The plaintiff, Mr. James Fletcher, carries on the business of a paper manufacturer at Leasley Mills, Stoneclough, in the county of Lancaster, on the River Irwell, and manufactures paper of a beautifully delicate and strong texture, such as cigarette papers, the finer kinds of copying papers, and delicately coloured tissues, for which it is necessary for him to have access to pure water, such as he has hitherto obtained from the River Irwell. The defendants, Messrs. Bealey and Co., are alkali manufacturers, who have their works at Radcliffe, some 6 miles higher up the River Irwell. In the course of their manufacture they produce very large quantities of refuse known as "vat waste" which up to a recent period was turned bodily into the river, until they were restrained from so doing by proceedings by the Salford Corporation under the Rivers Pollution Prevention Acts. They have recently taken from the Lancashire and Yorkshire Railway Company a small piece of land between 3 and 4 acres in extent, lying between the Bolton, Bury, and Manchester Canal, of which the railway company are proprietors, and the River Irwell, nearly 1½ mile above the plaintiff's mill, for the purpose of disposing of their "vat waste." The piece of land in question lies below the level of the canal on a slope, and on that piece of land they have already accumulated a considerable heap of the waste. It is admitted by the defendants that when deposited in a large heap the substance will heat, and if not carefully managed may actually catch fire, and become a source of danger to the neighbourhood from the suffocating fumes that would arise; also that in process of time there will arise from such heap a green liquor, which if allowed to get into the river to an appreciable extent would when the water was used by the plaintiff for the manufacture of his paper spoil it; and also that if all the liquor that will ooze from the heap after a time were to find its way into the river, the water would be so polluted that the plaintiff would be affected; but the defendants averred that their manufacture and disposition of waste was properly managed; that there was practically no danger of any ill effects being perceived by the plaintiff. There were two other sources of alleged imminent danger, one because, as it was said, the ground on which the heap was being extended was treacherous and likely to slip and let the heap bodily into the river; the other because, as it was said, the canal banks were likely to slip and the water to pour out and carry away with it a certain retaining wall, and so carry the heap of noxious waste into the river. And it so happens that this motion was partly heard as long ago as August last, immediately before the Long Vacation, but stood over till December, when it was heard out, and during the interval the canal did actually burst its bounds at a point below the defendants' heap, and carried with it the upper part of a retaining wall, thus apparently justifying the plaintiff's apprehensions. However, there was counter evidence given on the part of the defendants, from which it was shown that this accident was the result of carelessness in letting the water into a part of the canal which had been widened and altered before the bank under the new towing-path had been properly built and consolidated.

Mr. Cozens-Hardy, Q.C., and Mr. Ryland appeared on behalf of the plaintiff; Mr. Higgins, Q.C., and Mr. Stirling for the defendants.

Mr. Justice PEARSON said there was no dispute about the law on such cases, and read expositions of the principle from three well-known cases, one from the judgment of Lord-Chancellor Brougham, delivered in 1834, in the case of "The Earl of Ripon v. Hobart," one from the judgment of Lord Atherley, when Vice-Chancellor, delivered in 1865, in the case of "The Attorney-General v. the Corporation of Kingston," and the third from the judgment of Lord Justice Mellish, delivered in 1874, in the case of "Salvin v. the North Brancepeth Coal Company." From those cases his lordship said he did not think he would be very far wrong if he laid it down that there must be two ingredients for a *quia timet* bill. He was not attempting to lay down under all circumstances what would be required, but, under the circumstances of this case, if no actual past damage was proved there must be proof of imminent danger, and also proof that the damage, if it came, would be, he would almost say, irreparable. His lordship then examined the evidence at length, a great deal of which was of a scientific nature, and exhibited the usual apparent opposition of opinion amongst eminent scientists, and came to the conclusion that the plaintiff had failed to make out a case, and dismissed the application, with costs.

THE NORTH-WEST AFRICAN COMPANY.

A petition for the winding-up of the North-West African Company (Limited) was presented by an unsatisfied judgment creditor, on Monday, to Mr. Justice Chitty, sitting in the Chancery Division of the High Court of Justice.—Mr. Macnaghten, Q.C., M.P., and Mr. Beal appeared for the petitioner; Mr. Vernon R. Smith, for the Adelpi Bank, Liverpool, also unsatisfied judgment creditors, supported the petition.—Mr. Ince, Q.C., M.P., on behalf of the company, admitted that there should be a winding-up order, but asked that the petition might be directed to stand over, in order that a meeting of the creditors and shareholders of the company might be held, with a view to the company being wound up voluntarily, in which case the winding-up might be continued, if necessary, under the supervision of the Court. The desire of the company was to wind up voluntarily, in order that the winding-up might proceed at Liverpool, where the company's offices and business were.

The stock and produce on the African coast was valued at 21,000l., and it was feared that a compulsory order would result in a forced sale. If there was a voluntary winding-up, there would be better facilities for forming a new company. The provisions of the Companies Act, 1862, intended that the order should be in accordance with the views of the general body of the creditors, and the learned counsel submitted that the creditors generally supported the desire of the company to have a voluntary winding-up.

Mr. Justice Chitty said that the company was admittedly insolvent, and, in fact, had no interest in the assets. It appeared that Mr. Justice Willis had during the Long Vacation already permitted the present petition to be postponed with the view of enabling the company to keep afloat, and pay all demands against it. The company had not availed themselves of this opportunity, nor had the creditors who stated that they desired a voluntary liquidation, but who did not appear at the bar to support their views. The petitioner had a right to an order, and he should make the usual compulsory order, but the order would not be drawn up for a fortnight, in order to give the company an opportunity of paying the petitioners' claims and costs, and also those of the creditor appearing in support of the petition.

PETROLEUM DEPOSITS IN BRITISH NORTH AMERICA.—It has long been known that vast petroleum deposits existed in the Red Deer river country, in the North-West of British North America, and explorations have shown that the tanks extend as far north as Edmonton; some say as far as the Mackenzie river. It is now learned that petroleum has been struck at a point a few miles west of Calgary, at the eastern base of the Canadian Rocky Mountains. The claims have already been taken up and registered. This discovery is regarded as of the highest importance to that part of the north-west.

THE DE BEERS MINING COMPANY (LIMITED), OF KIMBERLEY, SOUTH AFRICA.—This company has opened a London agency at Queen Victoria-street, E.C., for transacting business in England, and where English shareholders may obtain full information regarding the operation of the company from time to time.

ALLEGED RAILWAY NEGLIGENCE—VERDICT FOR THE COMPANY.

NEWCASTLE ASSIZES, JANUARY 21.

(Before Mr. Justice CAVE.)

KEENAN V. THE NORTH-EASTERN RAILWAY COMPANY.

This was an action brought by Thomas Keenan, labourer, Crawshaw-street, New Gateshead, on behalf of himself and wife, in respect of the death of their son, alleged to have been caused by the negligence of the North-Eastern Railway Company. The company denied the negligence, and pleaded contributory negligence on the part of the deceased.

Mr. Waddy, Q.C., and Mr. J. E. Joel were for the plaintiffs; Mr. Seymour, Q.C., and Mr. Edward Ridley for the defendants.

The facts, as set forth by Mr. Waddy, were that the deceased was 21 years of age, and, as a perfectly sober, hard working young man, was the principal support of his aged father and mother and a young family. He was a member of the Militia, and on June 16 last he and several companions left Gateshead by train for Barnard Castle, there to join their regiment. Shortly after the train had passed Birtley Station the deceased went to the outside door for the purpose of looking out. The door had not been fastened, and immediately the deceased touched it it flew open, and he was thrown out. The driver saw the occurrence, and pulled up the train. Deceased was picked up and placed in the van, but he died before the next station was reached.

The defence was that the deceased man was under the influence of liquor, and that he deliberately opened the carriage door for his own convenience, and being intoxicated overbalanced himself and fell on to the rails.

A number of witnesses were examined on either side.

Verdict for the defendants, and judgment accordingly.

COMPENSATION FOR DAMAGES BY COLLIERY WORKINGS.

DURHAM ASSIZES, JANUARY 23.

(Before Mr. Justice CAVE.)

Mrs. Ann Garget and Mrs. Mary Dalkin, widows, residing at Woodlands, near Barnard Castle, brought an action against Messrs. Whitwell and Co., lessees of the Woodlands Collieries, to recover compensation for trespass and for damages caused to the plaintiffs' house and land by the defendants' colliery workings. Mr. F. Lockwood, Q.C., and Mr. Edge were for the plaintiffs, and Mr. Manley for the defendants.

The plaintiffs are the only surviving children of James Heseltine, whose family has owned free house and land at Luntun Hill Gate, in the parish of Lynesack and Loftly since 1763, and they were entitled to the freehold of the property. Prior to 1876 the property had been tenanted, but in that year Mr. and Mrs. Garget went to reside upon it. In 1879, the house, which had been previously rebuilt by the late Mr. Heseltine, was discovered to be cracked in several places, as was also the road in front of it. Enquiries having been made it was learnt that the defendants had taken about 1200 tons of coal from the five-quarter seam, which ran under the property. A small land sale colliery had been carried on near the property 30 years ago, but the proprietor did not touch the plaintiffs' property, having worked round the Brockwell seam, which lay beneath the five-quarter seam. The defendants had paid 50l. into court, but the plaintiffs said that the actual damage to the house amounted to over 300l., it having had to be rebuilt.

During the hearing of the case an agreement was come to by which the plaintiffs were to receive 656l. without costs.

A verdict was then entered for that amount.

GLASGOW CARADON CONSOLIDATED COPPER MINING COMPANY (LIMITED).

The following is the twenty-fifth report to be submitted to the general meeting at Glasgow, on Monday next:—

In submitting the annual accounts the directors feel that, as the circular recently issued to the shareholders contains the chief points of importance regarding the mine, they have not much to add to the information contained in it and the full report from the agent. As the shareholders will remember 4000 seven per cent. preference shares were created. Of these 2719 were taken up by the shareholders, the manager advising the directors that these would enable him to reach the 126 fm. level. This has been done, but the fall in the price of copper to an unprecedentedly low price has very seriously affected the returns, as not only has it made a difference in the sales, according to the manager's calculations, of over 500l., but has prevented him putting out ore from many portions of the mine, especially in the shallower levels which he could have done at a profit had the price continued even as last year. He states that had the prices then ruling continued he would now be working at a profit, but that his output being now nearly confined to the 126, there is not enough of the ore ground, which is seen to be most promising, laid open to enable him to pay costs at present prices of copper. As stated in the circular which the shareholders will have received, the manager estimates that to open the 126 sufficiently at least 1000l. in addition to the output would be required, and the directors feel that the most advisable course for the shareholders is to take up the unissued preference shares. The shareholders will see that the present position is owing entirely to the fall in copper to a price which could never have been anticipated, but the directors think it must be so far satisfactory that the expectations of the manager regarding the 126 fm. level have been realised, and they think that this should give the shareholders confidence in now following his advice. They consider that the present price of copper cannot last, and that with a rise in it, which it is only reasonable to expect, the mine will come into a prosperous condition. The directors who fall to retire this year are Messrs. Archibald Arrol and Forrest Frew, who, being eligible, offer themselves for re-election.

CHILLINGTON IRON COMPANY.—On Tuesday a meeting of shareholders of the Chillington Iron Company was held, at Wolverhampton, to confirm the resolution passed at the last meeting for winding up the concern by voluntary liquidation. Mr. George J. Barker presided. Alderman Annan, Mayor of Wolverhampton, read the report of the investigation committee, which showed that besides the Chillington there were two extensive ironworks, one at Wednesbury, and one at Bilston. Near to Chillington they had 200 acres of freehold land; 500 acres of mining property had been worked out, and large galvanising works at Liverpool had recently been disposed of. The whole of the company's assets had been assigned to Mr. Alfred Hickman, to secure 31,000l. advanced last year at 7 per cent. interest, and in addition mortgages had previously been given to Messrs. G. and T. Barker to secure 18,000l. The Chairman pointed out that the position of the company was not exceptional, and that they were not worse off than many of their neighbours. He was anxious that the valuable property should, with care and better times, be favourably realised. After a lengthy discussion, the resolution for voluntary winding-up was confirmed, and two liquidators were appointed.

An accident by which a young man named George Dixon, 18 years of age, lost his life, and a man named Bryan Rane received serious injuries—which it is feared will terminate fatally—occurred at the George Pit, Etherley Colliery, Bishop Auckland, about five o'clock on Saturday morning week. The men, who were blacksmiths, had gone into the pit for the purpose of socketting a rope, and were returning to bank by a drift. When within a short distance of the mouth of the drift at a part where the road passes over the top of the roof gave way, and they were buried underneath. A man named Henry Dinsdale, who was following at a short distance behind, on finding what had happened, at once procured assistance, and had the unfortunate men extricated, when it was found that Dixon was quite dead, and Rane had received severe internal injuries. Mr. Williamson, of Witton Park, was speedily summoned, and attended to the injured man, who still lies in a very precarious condition.

THE ANGLO-AMERICAN BRUSH ELECTRIC LIGHT CORPORATION (LIMITED).

The annual report of this company, to be presented to the meeting on Wednesday, says:—The directors beg to submit to the shareholder the report and statements of accounts for the year ended Dec. 31st 1884. The need for a lengthy report upon the proceedings of the corporation during the past year is lessened by the publication in July last of an *ad interim* report, which informed the shareholders of the business and progress effected during the first half of the year, and by the issue of the circular in view of the extraordinary general meeting, on Dec. 22, at which the provisional agreements for the absorption of the Great Western Electric Light and Power Company and the Brush Midland Electric Light and Power Company were adopted. The shareholders will have concluded from the half-yearly report already referred to, as well as from the universal depression of trade throughout the country, that the expectations of a revival of business entertained a year ago have not been realised to the full extent. Nevertheless, the board have the satisfaction of being able to congratulate the shareholders upon the great advance made by the corporation, and upon the decidedly improved position which electric lighting occupies among the industries of the world. The progress made by the corporation in perfecting its apparatus and in extending its business has been very considerable, and consequently good progress has been made, as will be seen from the accounts, towards attaining a dividend-paying position. This advance is in a large measure attributable to the fact that the corporation have extended the scope of their operations by undertaking the work of contractors, and to their having secured important and remunerative contracts from the Government and other sources for the installation of the electric light; and the directors are glad to recognise in the cordial manner in which the proposal to amalgamate with two of the subsidiary Brush companies was agreed to that the shareholders appreciate and support the policy of the board, which renders possible this extension of the sphere of operations. The concentration of the manufacturing works begun in 1883, by the removal of the incandescence department from Portpool-lane to the Victoria Works, proved so marked a success both directly and indirectly in the reduction of expenditure, and in the increase of general efficiency which resulted therefrom, that the board determined, after careful consideration, to continue this concentration by arranging that the operations hitherto conducted at the Borough-road premises should be carried on as far as practicable at the Victoria Works. The economical advantages resulting from this concentration of work are not fully reflected in the accounts for the past year, inasmuch as the new arrangement was not completed until quite recently, but the course adopted will it is hoped during the current year contribute materially towards a further appreciable reduction both in the cost of manufacture and in the standing charges.

The shareholders were informed at the last annual meeting that an understanding had been come to, subsequent to the issue of the report, with the British Electric Light Company, by which the action instituted by that company against the corporation was abandoned, it being admitted that the Brush machine in no way infringed the Gramme patent. A satisfactory settlement was also arrived at with Messrs. Latimer, Clark, Muirhead, and Co., between whom and the corporation cross actions were pending with regard to disputed accounts; and an arrangement has been made with the Hammond Company by which they have, for a consideration, been released from their contract to repurchase the apparatus returned by them under the agreement referred to in the last report. The directors regret the heavy loss sustained by the corporation in connection with the law-suit, *re* Muir and Co., reported to the shareholders in July last. The corporation are now, however, happily not involved in any litigation, and the directors trust that the exceptional items of law charges which have hitherto absorbed so large a proportion of the gross profits will find no place in the future profit and loss accounts of the corporation. The board, however, cannot but regard it as their first duty to take such steps with a view to the maintenance and protection of the valuable patent rights of the corporation, as may from time to time become necessary, and to exercise due vigilance in detecting and taking proceedings in respect of infringements. The directors felt it incumbent upon them to take active steps to obtain adequate amendments in the legislation with regard to electric lighting, and early last year the corporation directed the attention of the public to the unprecedented and exceedingly onerous conditions imposed upon electric lighting contractors by the Act of 1882, which is so largely responsible for the delay in the establishment on a large scale of central stations, in the absence of which the supply of electricity for house-to-house lighting cannot be economically undertaken. Later in the year a deputation to the Board of Trade was organised by the Chairman, and, as the shareholders are already aware, the interview with the President of that department was of a character to encourage the hope that a fair and reasonable proposal of reform will be favourably received by the Government. To judge from the feeling of the public, as expressed by the Press, the country now generally recognises that an important industry is suffering from unduly repressive legislation. Since the time when the deputation waited upon the Board of Trade a powerful and representative committee has been constituted to formulate, at the request and for the consideration of the Board of Trade, the views of the electric lighting companies and others interested in the matter, as to the nature of the amendments required. The cause of reform has also been very materially promoted by the independent action of other bodies. A very excellent report upon the subject has been drawn up and submitted to the Board of Trade by a society of electrical engineers; and public opinion may fairly be said to be aroused in the matter, so that it may reasonably be hoped that the injury unintentionally inflicted upon Electric Lighting by Parliament will speedily be remedied. The manufacture of the improved Brush armature has been systematically proceeded with, and the results obtained exceed the expectations formed regarding it. By its use the output of the Brush dynamo is increased by fully 40 per cent., and the efficiency is also very greatly increased. These new armatures are made interchangeable with the old, and no other part in the machine requires alteration. A considerable demand already exists for them, and it may be confidently expected that this demand will increase, and that every machine in use will be ultimately so fitted. The Ratchet lamp (Brush Sellen patent) of which mention was made in last year's report has also been well introduced, and has given complete satisfaction as an almost absolutely steady and unflickering lamp. The system of manufacture pursued in the case of this as well as of the Brush lamp is the same as that for the dynamo—so secure an interchangeability of parts. At the same time the Brush lamp still holds its own as the most simple, reliable, and enduring lamp for ar lighting in exposed situations. In the incandescence department satisfactory progress has been made. The Victoria machine has fully maintained its high position as the leading machine for incandescence lighting in the market. Great improvements have been made in its armature with excellent results, and various minor but substantial improvements have also been introduced without increasing the price, and not only has the cost of production of the machines been materially reduced by the organised system of manufacture, but the Victoria as well as the Brush dynamo are now made so that the parts of similar machines are interchangeable, thus increasing their relative value, and enabling the corporation to sell at higher prices. Special attention is being given to the manufacture of lamps of high candle-power, and the Victoria lamp takes a prominent position amongst the best known incandescence lamps.

In connection with the extension of the business of the corporation as contractors for installation work, it became necessary to work out complete sets of fittings, for ship, factory, and private lighting, and the production and sale of these will henceforward form an important part of the business of the corporation. The capital account has been increased by 7992*l.*, the amount received from holders of partly paid shares in the exercise of the option given them of making their shares fully-paid. The maximum number of fully-paid shares the corporation are eventually liable to issue to the shareholders in the Great Western and Brush Midland Companies is stated in the balance-sheet, but the actual amount of capital that will ultimately

have to be issued is dependent upon the number of fully-paid shares in these companies that will be surrendered. The total amount owing by the corporation to creditors and on bills payable is 3726*l.* 6*s.* 4*d.*, and the good debts due to the corporation amount to 19,560*l.* 16*s.* 8*d.*, and the cash at their credit with the bankers and in hand stands at 10,541*l.* 4*s.* 2*d.*, the satisfactory position of the corporation will at once be realised by the shareholders and the public. The amount of the provision against shares held by the corporation in subsidiary companies has been reduced from 99,200*l.* to 50,000*l.*, the shares of the Brush Midland Electric Light Company, Great Western Electric Light Company, and Eastern Electric Light Company, having been eliminated from the contra account, owing to these companies being now in voluntary liquidation.

The patents accounts show an increase of 3676*l.* 12*s.* 11*d.* upon last year's valuation. This increase represents the cost of maintaining the English and foreign patents, and of the experiments and other initial steps necessary to obtaining patent protection for the several inventions which have been developed in connection with the advance made by the corporation in the various branches of its manufacture, and in introducing the new machines and apparatus. Under the head of appropriation of profits the directors recommend the reduction of patents account by the amount of 1500*l.* as a matter of principle, and not because they believe that there is anything either in the present aspect of affairs or in the general progress of electric lighting to call for a depreciation in the value of the patents possessed by the corporation. The events of the year have really tended to increase the intrinsic value of these patent rights, and the board are of opinion that the figure at which this asset stands in the books represents its nominal value. As a result of the concentration of the manufacturing arrangements, a considerable amount of the plant, fixed and otherwise, at the Borough-road and Portpool-lane premises, has been consigned to stock, and will be further employed or eventually realised as opportunity offers. It has consequently been deemed advisable to have a careful re-valuation and re-adjustment made of the property and stock accounts, the result being to reduce the property account to 40,147*l.* 9*s.* 6*d.*, and to increase stock account to 69,171*l.* 11*s.* 1*d.*; the latter figure representing the minimum cost value of the stock on hand, stores, and goods in course of manufacture. In view of the extremely low figure at which property stands in the books, and having regard to the increased efficiency resulting from the concentration of the works, it is not thought necessary to make any reduction this year in respect of depreciation. The amount of 413*l.* 7*s.* 4*d.*, representing premiums on insurance, rent, &c., paid in advance on account of 1885, and not, therefore, chargeable against last year's revenue, has been carried to a suspense account.

The item "Assets Realisation Accounts, 29,475*l.*," represents the gross value of the assets to be transferred from the Great Western and Brush Midland Companies, in addition to the 4000*l.* cash which has been already received. The absorption of these companies was not effected in time to enable the various assets to be incorporated in the books of the corporation under their respective heads, but it is estimated that when the liquidation of these companies has been closed, the undermentioned accounts will be increased as follows:—Property Account: By the value of plant at lighting stations, installations on hire, freehold and leasehold land and buildings, &c., 12,700*l.*—Stock Account: By the value of manufactured goods on hand, 4000*l.*—Cash (in addition to the 4000*l.* already received): 6800*l.*—Patents Account: By balance representing goodwill and surrender of Brush and Lane-Fox licenses for 28 counties in England and Wales, 5975*l.* In addition to the above-mentioned assets, the corporation, as shareholders, have received from the Great Western Company 1000*l.* This amount has been carried to credit of profit and loss account, and will be dealt with in the appropriation of the net balance of profit.

It will be seen from the profit and loss account that the result of the year's operations is a gross profit of 22,948*l.* 10*s.* 3*d.*, including profit on shares in Great Western Company, proceeds of sale of patents and bad debts recovered, less provision for doubtful debts, and that after deducting all standing charges and expenses, there remains a surplus profit on the year's working of 5743*l.* 18*s.* 6*d.*, notwithstanding the heavy loss attendant upon the Muir law-suit, and after charging sundry items more properly belonging to the previous year. From this profit, however, has to be deducted the adverse balance of 1616*l.* 3*s.* 2*d.* brought forward from last year, leaving as the available result of all the transactions of the past year, a net surplus profit of 4127*l.* 15*s.* 4*d.*. An analysis of this profit and loss account will show, not only a very marked improvement in the business effected, both as regards its volume and its profitable character, but also that the efforts of the board to economise in every department have been, in a very high degree, successful. Comparison with the operations of the previous year shows that the gross actual trading profit has increased by nearly 120 per cent., while the standing charges have been reduced by more than 45 per cent. The directors recommend that of the amount standing to credit of profit and loss account, 1000*l.*—being the sum received in respect of the shares of the Great Western Company—be applied to reduction of the cost of goodwill and licenses, that 1500*l.* be applied to the reduction of patents account, as explained in paragraph 16, and that the remainder amounting to 1627*l.* 15*s.* 4*d.* be carried forward to next account. The directors who retire by rotation are Mr. Gibbs, Mr. Courtenay, and Mr. Ladd, who, being duly qualified, offer themselves for re-election. The directors have pleasure in announcing that Mr. Joseph Bevan Braithwaite, jun., a member of the firm of Messrs. Foster and Braithwaite, and late Chairman of the Great Western Electric Light Company, has at the invitation of the board expressed his willingness to join the directorate, but as the board are not empowered, under the Articles, to appoint an additional director they nominate Mr. Braithwaite for election by the shareholders.

THE THAMES BANK ON FIRE.—A troublesome and difficult duty has been imposed upon the Royal Engineers by the ignition of a great mass of the Thames bank at Woolwich Arsenal, which, after burning and spreading for several weeks, is still on fire in two or three places. The bank has been formed by the deposit of refuse from the Arsenal workshops, and for 10 years or more truck-loads of ashes, slag, cotton waste, and other rubbish have been shot down at the rate of many tons per day, thus enclosing a marshy foreshore, and creating a broad wharf, which is becoming of much value as a site for new Government buildings. When the fire was first observed about a month since it was not regarded as of any serious consequence, the belief being that it would burn itself harmlessly away; but as it extended over the space of about an acre, and was getting towards the powder magazines, though still half a mile distant, the engineers of the Works Department were called upon to suppress it. Water has been continually pumped upon it by a steam-engine, but with very little effect, and the engineers have now cut a trench 20 ft. deep across the bank, which will probably hold the fire in check, and prevent the damage which it has threatened to adjacent buildings. Other holes have been sunk and filled with water, but, owing to the depth at which the fire exists, water seems to have scarcely any influence, and the most that can be done will be to confine it within a limited area.

REPRESENTATIVES of the South Wales and Monmouthshire Colliers and Colliery Owners met Mr. Wales, the Government Inspector of Mines, at Pontypridd on Wednesday, to see if an arrangement could be made on the shot-firing question. No settlement, however, could be arrived at, and it is stated that the test prosecution of a Rhondda colliery proprietor for permitting shot-firing will be proceeded with. The Welsh coalowners are resolved to defend the case.

THE London and Glasgow Engineering and Shipbuilding Company, who were formerly on the Admiralty list for ships, have had intimation sent them to the effect that, after the recent inspection of their works, the Lords Commissioners of the Admiralty have added their name to the Admiralty list of contractors who may be called upon to tender for the construction of engines for Her Majesty's navy.

SHOT-FIRING IN MINES.

Mr. GEORGE HOWELL, in an interesting letter to the *Times* of Tuesday, in reference to this subject, thus endorses the views we have previously expressed in reference to the danger of Shot-Firing in mines. He says:—When the official reports of mining accidents for the past year make their appearance, it will be found that 1884 will have a cleaner record as regards fatal accidents than any year since the commencement of the publication of the official returns annually submitted to Parliament. It will also be found that, notwithstanding the partial depression in trade and the greater economy of consumption, the output of coal has far exceeded that of any previous year. The total output in 1883 was 164,000,000 tons; that of 1884 will, I think, approximate to 170,000,000 tons at a rate of increase far exceeding the estimate of the late Professor Jevons when discussing the "coal question," and the probable, or possible, exhaustion of our available coal supply. If the increase during the present and next year should only equal in tonnage that of 1884 we shall have nearly reached the estimated output for 1886, without adding the proportionate increase on each year which is inevitable, and which will, in all human probability, greatly exceed the relative increase in 1883 and 1884 respectively. If trade should revive during the present year, as seems very probable, the consumption of coal will necessarily be much greater than it ever was before. If fuel has been economised in the production of iron and steel it must be greater than ever in connection with shipping, for during the past four years immense progress has been made in the conversion of our mercantile marine from sailing ships to steam ships, and it is well known that the consumption of coal by the latter is enormous. Few persons seem aware of the vast and ever-increasing rate at which the coal stores of the country are being exhausted, or they do not sufficiently consider the importance of the stupendous fact. Within the period covered by the reign of Her present Majesty the annual output of coal has increased from about 30,000,000 tons to about 170,000,000 tons, only in some 47 years. The consideration of these facts has revived the proposal for an export duty on coal, as was done by Mr. Ellis Lever, of Bowdon, in the *Times* quite recently, quite apart from the question of Free Trade versus Fair Trade in its more general aspects and bearings.

The only figures at present actually available as regards fatal accidents in coal mines in 1884 are those relating to explosions in mines. But the statistics respecting all other fatal accidents are usually approximately relative and proportionate to those caused by explosions. The latter, when they happen, not only kill a number of persons at the time of the occurrence, but they frequently occasion many deaths subsequently by causing fissures and loosening the earth in the roofs and sides of the mine, and thus contributing to many of the fatal accidents annually resulting from this prolific cause of death and injury in coal mines. The number of deaths from explosions last year was 51 only; the lowest upon record. An examination of the returns for previous years since 1850 gives the following results:—The annual average number of deaths from explosions from 1851 to 1860, inclusive, was 241.1; from 1861 to 1870 it was 226.7; and from 1871 to 1880 it was 268.6. Taking the three years preceding 1884 the numbers were—1881, 116; 1882, 250; and in 1883, 134; while last year the actual number of deaths, as before mentioned, was 51 only. This exceedingly gratifying circumstance leads me to the conclusion that there is a possibility not only of keeping to this low annual rate of fatal accidents from explosions, but of still further minimising the number, and that, too, permanently.

But these figures by themselves do not sufficiently indicate the hazardous nature of coal mining, nor the measure of the progress made, and the true nature and cause of the improvement. The actual and proportionate loss of life prior to Government inspection is not accurately ascertainable, but we can judge from the statistics since 1850 that it was fearful, relatively to the number employed, and the annual output of coal. The 33 years of Government supervision and inspection have not been fruitless of beneficial results. If ever there has been a case in which State interference in the economics of industry has been fully justified by experience and results it is as regards the inspection of mines. Every fresh step taken by the Legislature has diminished the risk of coal mining, and decreased the loss of life in connection therewith. The effect of each successive piece of legislation is stamped, so to speak, upon the statistical tables giving the annual number of accidents, and the total number of deaths yearly, as the following figures will show:—The annual average number of deaths in mines, from all causes, in the three decades above referred to was—in 1851-60, 1001.8; in 1861-70, 1062.6; in 1871-80, 1135; and in the next three years the numbers were—1881, 954; in 1882, 1126; and in 1883, 1054. If we examine these figures more closely, and in connection with the several groups of figures given in the statistical tables, we shall find that, in proportion to the number of persons employed, there is a real and substantial decrease; and this decrease accentuates the periods of legislation. The average number employed in each year of the first decade given—1851-60—was 246,032; the number of deaths was 1001.8, or one in every 245; the ratio being 4.072 per 1000 employed. Further legislation having taken place, the effect of it is visible in the figures of the succeeding decade. The average number employed from 1861 to 1870 had increased to 319,240; the total number of deaths being 1062.6, or one in every 300 employed; the ratio being 3.328, approximating to a reduction of nearly one-third annually.

The decade 1871 to 1880 felt the full beneficial effects of the legislation of 1872—the Mines Regulation Acts of Lord Aberdeen. During this period the average number employed had increased to 482,183, while the average number of deaths had diminished to the proportion of 1 to every 425 employed; the ratio being 2.353, or a diminution in the 10 years of nearly one-third. The ratio for the next three years was as follows:—In 1881, it was 1.925; in 1882, which was a calamitous year for explosions, it rose again to 2.234; and in 1883 it was 2.240. Last year we may confidently anticipate that the ratio will not greatly exceed 1.250 per 1000 employed.

If we estimate the number of deaths by the output of coal the result will be found to be equally satisfactory, in so far as the proportionate diminution of fatal accidents is concerned. From 1851 to 1860 the relative proportion of deaths to output was one death to every 64,744 tons raised; from 1861 to 1871 one to every 90,302 tons raised; from 1871 to 1880, one to every 114,451 tons raised; while in 1883 there was one death to every 169,605 tons raised. Last year will show approximately one death to every 200,000 tons raised, a most material decrease in proportion to tonnage. These figures are all the more encouraging, because they show that the whole course of beneficent legislation has been most strikingly justified as regards mining casualties by the results—increased safety to the miner and to mining property also, both being concurrent.

Although no new legislation has actually taken place since 1880: the further protection of the miner, there will be no stretch of imagination in concluding that similar causes have been productive of like results. The more recent improvements are, in my opinion, distinctly traceable to the growing solicitude for the welfare of the miner, and to the action taken during the last four years. It will be in the recollection of your readers that much has been done of a partially legislative character, though not by statute, since the commencement of 1880. In the first place, the Accidents in Mines Commission have been pursuing their investigations into the causes of accidents in mines, and, by the experiments from time to time made, they have directed the attention of colliery-owners, mining engineers, overlookers, and working miners to the weaker points in colliery management, and to the causes of accidents, more especially as regards explosions, and the conditions, local and general, atmospheric and otherwise, above and below ground, which are conducive thereto.

Secondly, the subject of blasting by gunpowder has received attention at the Home Office, and its use in fiery mines has been abolished. Had the prohibition been made absolute the total number of deaths last year from explosions would have been reduced by three or four in South Wales, as recently pointed out by the *Mining Journal*. The use of gunpowder for blasting purposes in coal mines is too dangerous to be longer permitted, whether or not it has the support of owners and miners, for even as a matter of economy in

coal getting it cannot be defended. In this matter the hands of the Home Secretary need strengthening. If those working in the pit are not alive to the danger, the public must demand prohibition on humanitarian grounds. We do not want to make orphans in order to prove the sincerity of our charity in supporting them, they are made sadly to fast every year.

Thirdly, the subject of safety-lamps has been thoroughly canvassed since Mr. Ellis Lever, of Bowdon, offered his prize of 500*l.* for a perfect safety-lamp towards the end of 1882. The attention thus drawn to the imperfection of the so-called safety-lamps in general use has educated public opinion with respect to the defective character of those "safeguards" in the mine. Many of the accidents formerly attributed to the carelessness of the miner were doubtless caused by the essential defectiveness of the lamp rather than by any act of commission or omission on the part of the miner. It is now absolutely proved that the safety-lamp in general use prior to 1882, and to a great extent still in use, is little better than a "death trap," as Mr. Lever describes it in one of his letters. The Davy might have been comparatively safe before a better system of ventilation was introduced into the mine, but the increased velocity of the air passing through the mine by a more perfect method of ventilation caused it to be less and less a safety-lamp in proportion as the current of air became more rapid in the air passages and workings. This increased velocity of the air current coming in contact with the "impalpable coal dust" floating in the mine made the whole atmosphere of the mine inflammable, and liable to explosion at any moment. The same current, driving through the gauze wire of the lamp, heated it to a white heat, and caused a flame outside the gauze wire—a flame often intensified by the oil attaching to it by its being cleaned with the oily cotton waste in common use for this purpose.

Since 1882 thousands of the old and more defective sorts of lamps have been replaced by newer ones of a better type. There seems, indeed, to be a real desire to substitute the safest lamp that can be obtained for the less perfect ones previously in use. The manufacturers of the newer and better kinds of lamps have been unusually busy for the past two years, so great is the anxiety to secure the latest and best. The newer lamps may not be perfect, but they are far superior to the older type of Davy lamp once thought so safe and reliable.

That greater safety in the mine is possible is proved by a fact which has just come to my knowledge. A large colliery company in the Midland district, Notts and Derby, whose output last year was close upon 600,000 tons, had not a single fatal accident in 1884. In this instance there was little explosive gas to contend with, but there was the usual liability to falls of roof, &c., which are, in the aggregate, as disastrous as explosions. With an increased number of inspectors, and more perfect inspection, better lamps, and gunpowder superseded by compressed air for blasting purposes, we may hope to see almost perfect immunity from mining disasters.

THE ENGINEERING TRADE.

Following the extracts given last week from the reports of the Trades Union Societies, it may be added that information gathered from authoritative sources, representing the large engineering employers throughout the country, gives but a very despondent outlook for the future. There is no doubt that, in spite of the assumed revival in the shipbuilding trade generally, depression is increasing, and along the East coast especially complaints are universal. It is hoped that some of the Government work given out may come into this quarter; but the competition is expected to be so keen that, beyond helping to keep yards going, very little profit is looked for out of any orders that are secured. Iron shipbuilders declare that two-thirds of their men are out of employment, and on the funds of their societies; and that, to meet the increased outlay thus entailed, the societies have raised their compulsory payments 50 per cent.—that is, from 1*s.* to 1*s.* 6*d.* per week. Tested by the Ironmoulders' Society, where trade is declared to be worse than it has ever been known, it may be added that in this society the weekly subscriptions have been raised 25 per cent., and the Amalgamated Society of Engineers is calling up a special levy for the benevolent fund of 6*d.* per member. In all Trade's Union Societies the outlay for the support of unemployed members is in excess of the revenue drawn from subscriptions, and a continuance of the present depressed state of trade will, in some cases, seriously test their resources. The locomotive building trade does not appear to be giving way to the same extent as other branches of industry, and some of the large firms have work in hand for a considerable time forward, but there is a general feeling that depression is also coming over this branch of trade. Railway rolling stock makers are also pretty well employed on orders in hand, but the weight of actually new work coming in is not large. Special tool makers are pretty well off for work, but the general tool trade is rather quiet. Machinists are in some cases busy, and in the Oldham and Bolton districts there is a fair amount of activity amongst the leading makers. This, however, does not extend generally, and many of the Lancashire machinists are very slack, and in all cases the competition for orders is very keen. The leading inland boiler makers are all fairly busy, but this is a branch of trade which is now in comparatively few hands.

A NEW COTTON PLANT.—A southern botanist, Mr. A. A. Luber, of Macon, Georgia, has been experimenting for several years to hybridize the cotton plant that grows wild in Florida with the common okra, and he appears to have been at last successful. The new plant retains the okra stalk and the foliage of the cotton. Its flower and fruit, however, are strikingly unlike either cotton or okra. The plant has an average height of 2 ft., and each plant has only one bloom. This is a magnificent flower, very much like the great magnolia in fragrance, and equally as large. Like the bloom of the cotton plant the flower is white for several days after it opens, after which it is first pale pink, and gradually assumes darker shades of this colour until it becomes red, when it drops, disclosing a large boll. For about 10 days this boll resembles the cotton boll, and then its growth suddenly increases until it reaches the size of a cocoon. The lint does not appear until this size is reached. Then its snowy threads begin to burst from the boll, but are securely held in place by the okra-like thorns or points that line the boll. Each boll is said to produce about 2 lbs. of very long-stapled cotton—superior to Lea Island cotton. There are no seeds in the lint, from four to six seeds, resembling those of persimmon, being at the bottom of the boll. The new cotton consequently, it is stated, needs no ginning, and it is thought will revolutionise the cotton industry of the South.—*Times*.

THE MANCHESTER COAL EXCHANGE.—The committee of the Manchester Coal Exchange have just issued their report and balance-sheet for the past year, in which they state they have pleasure to report the continued success of the Exchange. Although it would be noticed that the surplus on the year's working was less than that of the previous year, it must be remembered that while the publication of the list of members increased the expenditure, the alteration in the scale of subscriptions entailed a loss of revenue; consequently, although the number of members had been increased to 396, there had been a slight falling off in the amount of subscriptions, and the committee trusted that in the coming year the members would be still further augmented. The revenue account for the past year has amounted to 202*l.*, of which 199*l.* has been received in subscriptions, and the expenditure to 183*l.*, leaving a balance of 19*l.*, which, carried to balance of profit from previous year, increases the funds in the hands of the society, including furniture and stock, to 155*l.*

SOCIETY OF ENGINEERS.—The first ordinary meeting of this session of the society will be held on Monday, Feb. 2, at the Town Hall, Caxton-street, Westminster. The President for the past year, Mr. Arthur Rigg, will present the premiums awarded for papers read during the year. The President for 1885, Mr. Charles Gandon, will deliver his inaugural address. The chair will be taken at half-past seven o'clock precisely.

FOREIGN MINING AND METALLURGY.

There is little news to communicate with respect to the French Iron Trade. The old quotation of 5*l.* 12*s.* per ton for iron is maintained with increasing difficulty, 5*l.* 8*s.* per ton having become the order of the day rather than otherwise. The foremasters of the Nord continue in a difficult position. Stocks of pig have been increasing of late in Silesia; there are 36 blast-furnaces in operation, and the weekly production has been carried to 8500 tons. Although the foundries and branches of the Silesian companies in Poland are good consumers, the consumption of pig in the rolling-mills of the district has fallen off. One of the rolling-mills has stopped working, but with the advent of the new year the situation is considered to be improving upon the whole. Heavy plates have been quoted at 8*l.* per ton; this, it is stated, scarcely covers the cost of production. The production of finished steel in Belgium in 1883 was 156,301 tons, of the average value of 6*l.* 1*s.* 1*d.* per ton. The corresponding production in 1882 was 151,291 tons, of the average value of 6*l.* 8*s.* 2*d.* per ton. The total of 156,301 tons representing the production of 1883 was made up as follows:—Rails, 118,138 tons; tyres, 9295 tons; miscellaneous rolled steel, 10,019 tons; wrought steel, 9797 tons; plates, 2084 tons; and steel wire, 6968 tons. The production of finished iron in Belgium in 1883 was 487,226 tons, as compared with 503,112 tons in 1882.

Little change can be reported in the Belgian Iron Trade. There have been numerous enquiries, but these have been based upon low and unremunerative prices. The contracts actually concluded have been of little importance, as scarcely anyone is disposed to do business upon anything like a considerable scale at present rates. The works are moving on from day to day, and few of them are assured employment for more than a week or two in advance. Quotations may be said to have shown, upon the whole, no change. Refining pig is stated to be becoming scarce in the Charleroi district, stocks having almost completely disappeared. The Monceau and Providence Works are completely relieved of their stocks, and it appears that an advance is even anticipated if the demand continues to maintain its present importance. English pig has, on the other hand, been depressed upon the Belgian markets, and rather considerable sales of No. 3 have been effected at 2*l.* per ton on truck at Antwerp. Athens has maintained its casting pig at 2*l.* per ton; this company has lighted a blast-furnace within the last few days. No. 1 iron has been quoted at 4*l.* 10*s.* 10*d.* per ton for exportation, and 4*l.* 12*s.* per ton on home account; No. 2 has been maintained at 4*l.* 16*s.* per ton, and No. 3 at 5*l.* 2*s.* per ton. No. 2 plates have continued to be quoted at 5*l.* 16*s.* per ton for exportation, and 5*l.* 18*s.* per ton on home account.

The Belgian Coal Trade has felt the influence of colder weather, which has prevailed of late in Belgium, the demand for household coal having increased in importance rather materially. No very large supplies have been laid in, but the tone of business has been decidedly more active, and prices have shown firmness. The position of the coal trade in the Couchant de Mons might be pronounced satisfactory but for the feebleness of the demand for coal for metallurgical purposes. Coke prices have continued to show weakness upon the Belgian markets. The movement of trucks carrying coal and coke over the Belgian State Railways in the third week of January was 18,572, as compared with 18,166 in the third week of January, 1884. The production of coal in Belgium would appear to be gradually increasing upon the whole, notwithstanding the comparatively unremunerative prices which have prevailed of late years. In 1874 this production was 14,669,029 tons. In 1875 it increased to 15,011,331 tons; but in 1876 it receded to 14,329,578 tons, and in 1877 to 13,938,523 tons. In 1878 it rallied to 14,899,175 tons, and since then it has steadily expanded, having been 15,447,292 tons in 1879, 16,866,698 tons in 1880, 16,873,951 tons in 1881, 17,590,989 tons in 1882, and 18,177,754 tons in 1883. Quotations have not varied to any sensible extent in the German coal trade. There has been rather more enquiry of late for household coal; but the demand for industrial coal has been weak.

MINERAL RESOURCES OF COLORADO.

The refusal of the large smelting works to furnish bullion statistics for publication at the end of each year is regretted by the Denver Tribune Republican which has nevertheless been able to collect a large mass of valuable ore and bullion figures. They state that Messrs. Mathews and Webb, ore and bullion brokers of Denver, have built up an immense business and are widely known and respected. During the past year they have issued regularly a weekly circular devoted to the general interests of the trade of the nation, and especially setting forth the condition of finance and the precious metals. Their enterprise and liberality in thus furnishing information of this very essential character to the miners and business men of a State like ours are commendable, and they are deserving of much credit therefor. Their circular of Jan. 2 is so full of valuable information that we give it full space. Trade throughout the country could not be expected to be very brilliant during the last days of the year, and it has not been. The financial condition still leaves a great improvement to be desired. The surplus reserve has decreased slightly, being now only \$40,125,000, but the various clearing houses show a decrease of 27 per cent. from the same week last year, and Bradstreet reports nearly 10 per cent. more failures. And yet while the appearances are not bright the fundamental conditions are in a very sound and solid position, and our present clouds are not without their silver linings. The balance of trade is in our favour. Foreign countries are taking our products with great readiness in large quantities. Prices are away down to bed-rock in every department. Money in large amounts is lying idle, and nothing is needed but the electric spark of confidence to set the wheels of trade into motion and to bring back good times.

The value of metals produced in Colorado for 1884 falls considerably short of last year, but at the same time also show the causes for same—Lateness of season and railroad blockades, first by snow and afterwards by washouts. The low price of lead causing some of the largest producers to close down, and the coal diggers' strike causing the blowing out of a number of furnaces. Denver is now acknowledged as the ore market not only for Colorado but the North-Western and Southern Territories. All the smelters throughout the country, as well as some European ones, are now represented, and the facilities for handling ores are constantly increasing. Statement of value of ores purchased and sold by Mathews and Webb during the year 1884:—

County.	Silver. Ozs.	Gold. Ozs.	Lead. Lbs.	Copper. Lbs.	Value.
Summit	17,570...	31,39...	173,980...	—	\$ 26,239-11
San Miguel.....	119,014...	1,159-85...	241,810...	—	163,594-65
Clear Creek	123,091...	3,338-17...	280,703...	57,871...	222,028-60
San Juan	110,420...	391-35...	525,900...	267,260...	183,227-40
Ouray	249,275...	23-56...	98,340...	69,818...	287,306-06
Custer	191,875...	16,522-92...	394,660...	—	566,799-01
Gunnison	32,058...	522-00...	53,399...	—	47,972-60
Gilpin	5,596...	667-68...	10,950...	18,410...	18,577-64
Park	8,983...	—	50,470...	—	9,498-22
Miscellaneous...	75,634...	625-91...	68,460...	—	98,599-51

Total

Copper has taken another tumble in a most lively fashion, and dealers are at their wits ends to know which way to turn. As usual the transaction has been shrouded in considerable secrecy, but the main facts have nevertheless been made public. The pool of manufacturers at New York and in the Waterbury Valley have bought a supply of Lake copper for the next five months on a novel plan, and as follows:—The deliveries are to be made convenient, and will aggregate about 2,250,000 lbs. per month, beginning in January, 1885. The extremes of price are to be not less than 10*¢*, nor in any case over 11*¢*, and the variation is to be based on the changes in the price of Chili bars in London, starting on the parity of 48*¢*, as being equal to 10*¢* New York. Each average of 10*¢* change from 48*¢* in London will cause 1-10*¢* to be added or deducted from the 10*¢* parity, and the average is to be calculated from sales in England from the 10th to the 25th of each month, and the

average of December makes the January price, that of January the February and so on. Another peculiar feature of the contract is that the manufacturers agree to use no other than Lake copper, which is a direct stab at the smaller and outside brands. It will not be a difficult matter for the Lake companies to manipulate the London price of Chili bars up to the 11*¢* parity, which would be 53*¢*, but there they must stop by limitation. The December price has in London been close to 48*¢*, so that the January New York price will be 10*¢* 3/4, the lowest figure that has been reached for copper. Meanwhile the New York market has been topsy-turvy, and the outsiders have not known whether to sell or buy: 100,000 lbs. were sold at 10*¢* 3/4, but Lake is held at 11*¢*. Our latest cables quote Chili bars at 47*¢* 10*¢*, and best selected at 54*¢*, a too wide discrepancy, but in execution of the "little game" recently exposed by us on the part of our English cousins.

Lead has been dull beyond all comparison, and the sales at the various points of distribution will not exceed 600 tons, nearly the lowest ebb of the year. Prices, too, have been without variation at \$3.40 St. Louis, \$3.40 and \$3.45 Chicago, and \$3.62 New York. The disposition to sell futures is not great, and the willingness to buy them is also by no means exuberant. Buyers look for higher rates, and sellers are smarting under the losses caused by the long contracts made just prior to a decline. There seems to be no reduction in supplies, but the severe weather obstructs hauling in the mountains, and a scarcity of ore in February and March seems now inevitable. The country will carry over into 1885 about 15,000 tons of made pig lead held in first hands.

The reported sale of Mr. Hamill's interest in the Terrible Mine to the company has created no little comment, and the general opinion seems to be that the change will be beneficial to all; it is to be hoped that it will, as this valuable property has for some time been doing but poorly, and it is thought that the company will expend considerable money in putting it in shape again. The Stevens Mine is showing splendidly, and many of the lessees are preparing to remain all winter. Johnny McFadden came down just before Christmas, and says the snow is full 4 ft. deep, and in some places 6 ft. deep for more than a mile at a stretch. Three excellent mill runs have recently been made on ore from the Vulcan Mine. The first from Nick Ennis's lease returned in two classes 427 and 211 ozs. in silver respectively. The second from the Johnson lease in one class returned 337 ozs. in silver. The last from Meyers Brothers' lease returned in two classes 686 and 261 ozs. in silver, and 37 per cent. lead.

The ore and bullion output of Chaffee County for 1883 will probably be somewhat in excess of \$300,000, of which amount, according to the figures furnished by A. Eilers, of the Madonna Mining Company, that mine furnished \$183,000.

Within the next 30 days, it is not unlikely that the question of locating the Murphy smelter will be decided. The natural point for it is Buena Vista. But it is a prize that any town in the valley might be glad to secure, and already both Natrop and Salida are in the field, competing for the location. The plant will probably cost not less than \$50,000, and would employ a large number of men. The action of the Town Board last Saturday night was proper and timely, and yet there is something for public-spirited citizens to do. We doubt not that a suitable site, with plenty of ground around it, and made accessible to the railroad by side tracks, donated to the Murphy Company would influence the location here. But what is everybody's business is usually nobody's business, and it is evident that a committee of representative citizens, to confer with the Murphy people and the railroad, should be appointed, who would be able and willing to devote their time to securing a proper understanding of the situation, and act accordingly. We believe such a committee would be able to accomplish the end desired. The Town Board might, after consultation with the proper parties, be able to appoint such committee with full authority to act and report to them. We hope the matter will be actively canvassed and some immediate action taken.

CANNOCK CHASE MINERS, AND THE CONCILIATION BOARD.—A meeting of miners was held last week in the School-room, Norton Canes, to consider the advisableness of getting out another sliding scale agreement and to prevent the dissolution of the Conciliation Board.—Mr. J. Southall explained that he had received a letter from the secretary of the Cannock Chase Coal Owners' Association stating that the members had decided not to collect any more subscriptions from the men in support of the board, as they could not see the utility of the board now the sliding-scale had been terminated. This practically put an end to the Conciliation Board, for the employers refused to recognise it. The representatives of the men had decided to hold a series of public meetings in order that the men might decide what steps should be taken in the matter. The employers would not enter into an agreement unless the whole of the district were prepared to enter into it and be bound by it, and if the men were of opinion that they would be best without an agreement they had best do away with the board, and let matters take their own course. There was not a large attendance, but those present discussed the question and reported that the men on the Brownhills, Chase Town, and Norton side of the district were opposed to the sliding-scale, and were in favour of the abolition of the Conciliation Board and the Board of Delegates. No formal resolution was taken.—At a meeting of the men held at Hednesford the delegates were instructed to take steps to get an amended sliding-scale, and also to keep the Board of Representatives in existence.

THE PROJECTED ERECTION OF IRON FURNACES IN THE NORTH OF IRELAND.—Since the holding of a meeting in the Belfast Chamber of Commerce last year, to consider the practicability of erecting iron furnaces, and of adopting a patent process for the smelting of iron, no action has been taken. The iron ore trade in Belfast is dull, and unless a reaction speedily takes place this industry here must become extinct. The committee appointed at the meeting held in the Chamber of Commerce to watch Bull's process for the smelting of iron in Wales, have never presented a report. At the meeting in question a doubt was expressed whether Antrim iron ore could be manufactured into iron without the mixture of other ores. Since then this doubt has been removed, and within the last few weeks there have been discovered beds of hematite iron ore in comparatively inexhaustible quantities not more than 2 ft. from the surface. This ore contained over 60 per cent. of metallic substance, and the landlords are understood not to be excessive in their demands for royalties. There are imported into Belfast annually almost 40,000 tons of manufactured and unmanufactured iron; and now, when there are found a mixture of ores to any quantity, limestone and lithomarge for the flux, moulding sand at command, and granite to be used in the erection of furnaces, it may not be too much to expect that an effort will be made to develop these great iron resources.

MR. CHAMBERLAIN AND THE RAILWAY BILLS.—Some days ago it was announced that the President of the Board of Trade had intimated his readiness to accept the second reading of the Railway Bills, which would be referred to a special committee. In response to an enquiry made in connection with the Birmingham Railway and Canal Rates Association, Mr. Chamberlain writes as follows to Mr. Reid, Birmingham:—Sir,—"The statement in the newspaper referred to is absolutely without foundation. I have not yet decided or even considered the proper course to take with regard to the Bills deposited by the railway companies, and before coming to any conclusion I shall certainly wait to hear what the representatives of the Traders' Association have to say."

MANCHESTER GEOLOGICAL SOCIETY.—The next ordinary meeting of the members will be held, on Tuesday next, in the Literary and Philosophical Society's Rooms, George-street, Manchester, at three o'clock in the afternoon, when the following subjects will be brought forward:—Paper: On a Possible Genesis of the Canadian Apatite. By Mr. G. H. Kinahan, M.R.I.A. Discussion on Prof. Dawkins' paper "On Deposits of Apatite near Ottawa." Vide Part 3, vol. 18. Discussion on Mr. De Rance's paper "On the Occurrence of Brine Springs in Coal Measures." Vide Part 3, vol. 18.—Paper: "On Accidents in Mines;" part 1—"Explosions." By Mr. J. S. Burrows, M.E.

SOME AMERICAN NEW PATENTS.

IMPROVED FURNACE DOOR.—A furnace door which is locked in its open and also in its closed position has been patented by T. R. BUTMAN, of Cleveland, Ohio. The door is provided at its upper edge with laterally-projecting pintles which rest in lugs cast on the door frame. One of the pintles is provided with a notched disc which is engaged by a weighted pawl. By placing the pawl into either of the notches the door is held open to a greater or less extent. The other pintle likewise carries a notched disc, but the notches are cut in an opposite direction, so that the engaging pawl serves to lock the door when closed. The door frame is provided with flaring side pieces which guide the fuel to the mouth of the furnace. Preferably, the door is made of an upper and lower section rivetted together. As the lower section will be destroyed first it may be removed and replaced.

ROLLS FOR FORMING LINK BLANKS.—Rolls for forming link blanks, and particularly blanks used for weldless car-coupling links, have been patented by J. T. WRIGHT, of New Albany, Ind. Each roll has formed upon its circumference four more or less raised projections or ribs extending from end to end. These ribs form the dies for severing the blanks. They are made with concave sides corresponding to the desired curve of the end of the blank, and the distance between them is equal to the length of the blank. The rolls sever the blanks, and at the same time form the end curves. They also, it is claimed, condense the metal at the ends, and thus increase the strength of the link at the point where it is subjected to the severest strain.

WIRE DRAWING MACHINE.—An improvement in a wire drawing machine has been patented by H. L. RAWSON, of Worcester, Mass. The improvement is designed to automatically stop the revolution of the receiving reel as soon as a snarl in the wire prevents its passage through the reducing die. The delivery reel is so connected to the work table that when the wire is caught the reel will be pulled over or slightly tilted. This motion puts into action a train of levers, which in turn raise the receiving reel and disconnect it from the gearing that revolves it. Thus the breaking of the wire, which would take place if the receiving reel would continue to revolve, is prevented. The motion of the receiving reel may also be stopped in the usual way by pressing upon a treadle, but this method is only to be used when the machine is to be definitely stopped.

FURNACE FOR BURNING WET FUEL.—A furnace for burning wet fuel, such as bagasse and similar substances, has been patented by A. W. COLWELL, of New York City. The combustion chamber is composed of three, more or less, grates, placed side by side, but at a considerable distance apart. The space between each pair of grates is taken up by standing walls, which constitute upwardly-projecting triangular surfaces. The walls are grooved from their upper to their lower end. Into the lower parts of the grooves currents of air or steam are forced through nozzles. The fuel is dropped on the grates, and leans on the inclined wall. Air channels being produced by the grooves, the fuel will always be in contact with oxygen, which will promote combustion. The jets of air thrown into grooves through the nozzles will still further increase the combustion. The heated gases from the fire chamber pass through a hollow arch into a channel which is located beneath the boiler.

NEW METHOD OF ATTACHING METAL HUBS TO THEIR SHAFTS.—A new method of attaching metal hubs or other cored castings to their shafts, without drilling or tapping the cast metal, has been patented by Mr. GARSIDE, of Jersey City, N. J. The hub is cored out inside in the usual way, and bored to fit the shaft. A nut recess is made in the hub, and communicates with the central bore. A screw hole extends through the hub from the recess to the outside. In securing the pulley on the shaft a nut is first placed into the recess, and the shaft is slipped into the hub; then a set-screw is inserted through the hole and made to engage with the nut. By turning the screw the nut is caused to press against the roof of the recess, while the end of the screw bears against and locks the shaft. The invention is intended to be applied to cored castings the form of which renders the application of a drill or tap difficult.

PROCESS OF ANNEALING WIRE.—E. TUCKER, jun., of Worcester, Mass., is the patentee of a new process of annealing wire and covering it with a metallic coating. Heretofore the wire was run first through a lead bath, then through a solution of muriatic acid, and finally through a zinc bath. This would cause the formation in the zinc bath of a metallic alloy of zinc and iron termed "stodge." The inventor proposes to utilize this substance and to substitute it for the lead. The wire is first run through the alloy, and then through the acid and zinc as usual. It is claimed for this invention that the wire treated as described is annealed with better advantage and with less expense. Moreover, the alloy, when once heated, retains its heat longer than the lead will, and consequently less fuel is required.

FENCE-WIRE STRETCHER.—A simple fence wire-stretcher has been patented by H. MCINTOSH, of Decorah, Iowa. The device consists essentially of a T-shaped casting, carrying a loose grooved roller at each end of the horizontal bar. The upright bar is provided at its bottom with a flange projecting forward, in which is a screw-threaded perforation. Through this perforation passes an upright screw, which has an oblong eye at its bottom and a swivelled head at its top. In use the two grooved rollers are placed upon the wire to be stretched, and the wire between the rollers is laid into a groove on the top of the swivelled head. The screw is next revolved by means of a key or lever introduced into the eye. As the screw rises the head carries the wire between the rollers upward, and thus stretches it taut.

HOLLOWAY'S PILLS AND OINTMENT.—SOLDIERS AND SAILORS.—These well-known and easily used remedies are especially serviceable and convenient for those who, like soldiers and sailors, are exposed to great changes of climate, and the hardships inseparable from their calling. Many of the diseases engendered in the system from these and other untoward causes can be checked and controlled by attention at their onset, and in Holloway's remedies will be found a ready means of relief, without hindrance from duty. Many a man is invalided and rendered more or less a burden to himself and friends from neglect of the early symptoms of his complaint, which calamity might be averted by timely resort to the use of Holloway's pills and ointment.

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Manufacturers of
BLASTING-FUSE
Of the highest quality.

DESCRIPTIVE LISTS WITH
TERMS AND SAMPLES ON APPLICATION.

This highly reputed Fuse is in constant demand for every description of blasting in all parts of the world.

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A RED THREAD RUNNING THROUGH THE CENTRE OF THE FUSE.

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QUARTZ STAMP MILLS,
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BUDDLES AND AMALGAMATING GEAR.

Gowan's Patent Gold Saver.

BOILERS OF ALL KINDS.

EARLY DELIVERY.



The New System for Working Gold,
Stream Tin, and Diamond Alluvials.

THE "BALL PATENT."

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THE BALL GOLD SYNDICATE—No. 3.

A small Syndicate is being formed to work a Ball Gold Dredging and Saving Plant on an extraordinary property on the following terms:—The Syndicators find the machinery and the capital to work it—about £2000 at most. They receive back out of gold raised—1. All their expenses.—2. One-sixth of the gold remaining after this deduction.

The concession is rich, inexhaustible, runs for about 50 years, and covers an enormous mileage of a river, in a most healthy climate, within one month from London, with good roads, cheap living, civilised country, and in fact every circumstance conducive to a great success.

CAPITAL HALF SUBSCRIBED.

MACHINERY IN HAND TO LEAVE WITH STAFF
IN JANUARY.

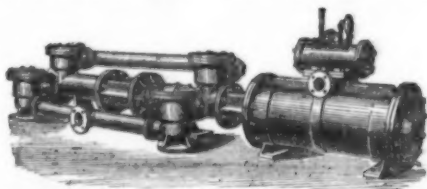
FEW SHARES LEFT.

See *Mining Journal*, Nov. 15, 1884, "On Prosperous Gold Mining Enterprise," and Nov. 29, 1884, "Ball Gold Syndicate—No. 3," page 1397.

HAYWARD TYLER & Co.
LONDON.

2 GOLD, 4 SILVER, AND 4 BRONZE MEDALS.

STEAM PUMPS.

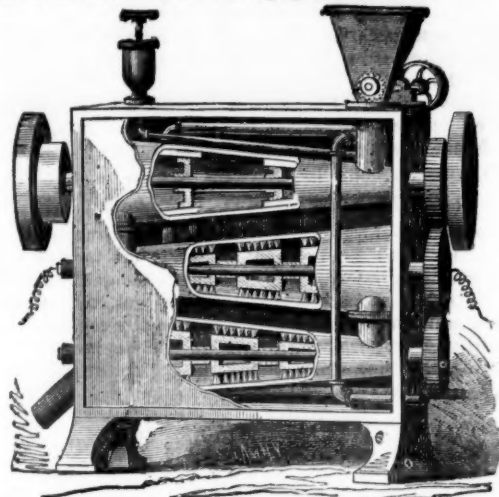


The "UNIVERSAL," for High Lifts.

NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never needs stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel rollers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamo electric machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—
1.—The saving of almost all the mineral passing through the machine.
2.—The loss being less than 10 per cent.

3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.
By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Sparey Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

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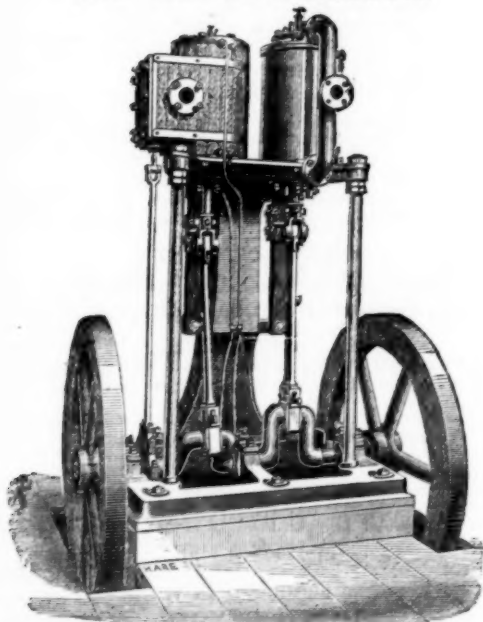
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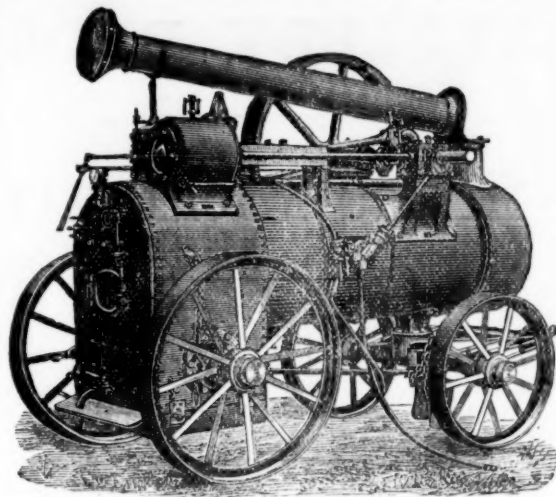
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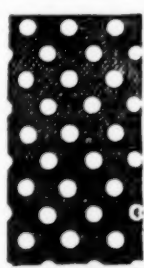
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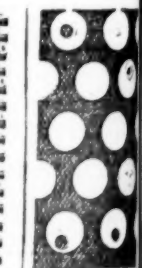
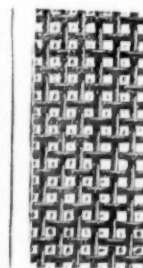
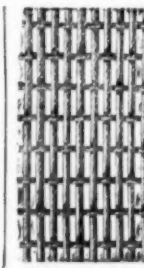
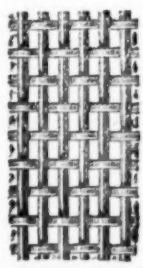
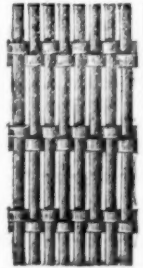
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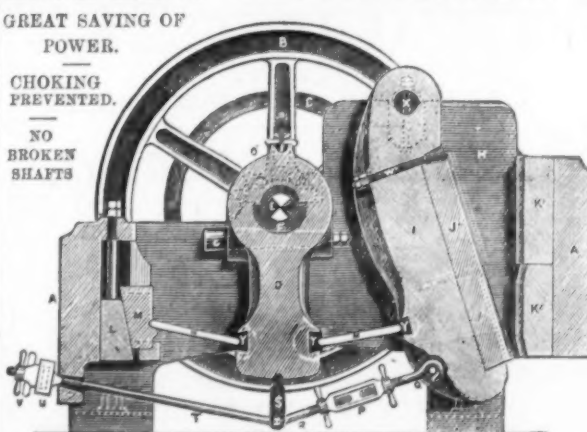
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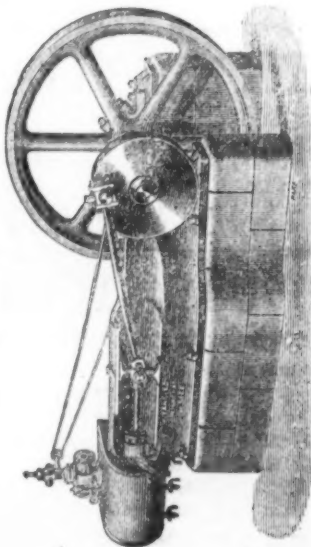
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(No. 1.)

TANGYES' HORIZONTAL STEAM ENGINE.
WITH PATENT GOVERNOR.



In this Engine the bed-plate, front cylinder cover, crosshead guides, and plunger block for crank shaft bearing, are cast in one, the cylinder with its valve chest being bolted to the end of the bed. The crosshead slippers and connecting rod ends are made adjustable, so that any wear can be readily taken up. The fly-wheel face, cylinder end, connecting rod, and crank pin are bolted.

All parts to Whitworth's Gauge: duplicates can be obtained by giving number of Engine.

The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

A Sole Plate for Back Chair is included in price.

The Feed Pump has Gun-metal working parts.

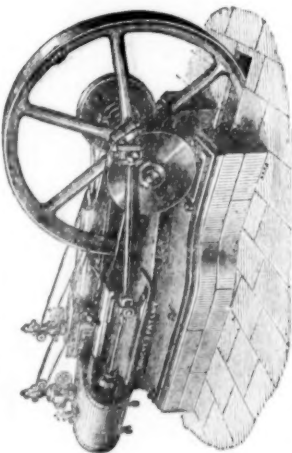
The H, I, J, K, and M sizes have 8-ram Jacketed Cylinders.

TANGYES' HORIZONTAL STEAM ENGINE.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cylinder	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
Revolutions per Minute	120	100	80	60	50	40	30	24	20	16	12	10	8
Price of Engine with Condenser	£ 180	£ 210	£ 240	£ 280	£ 320	£ 360	£ 400	£ 440	£ 520	£ 600	£ 720	£ 840	£ 960
Price of Engine with Condenser and Fly-wheel	£ 220	£ 250	£ 280	£ 320	£ 360	£ 400	£ 440	£ 480	£ 560	£ 640	£ 760	£ 880	£ 1000
Price of Engine with Condenser and Fly-wheel and Link Motion	£ 260	£ 290	£ 320	£ 360	£ 400	£ 440	£ 480	£ 520	£ 600	£ 680	£ 800	£ 920	£ 1040
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 300	£ 330	£ 360	£ 400	£ 440	£ 480	£ 520	£ 560	£ 640	£ 720	£ 840	£ 960	£ 1080
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 340	£ 370	£ 400	£ 440	£ 480	£ 520	£ 560	£ 600	£ 680	£ 760	£ 880	£ 1000	£ 1120
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 380	£ 410	£ 440	£ 480	£ 520	£ 560	£ 600	£ 640	£ 720	£ 800	£ 920	£ 1040	£ 1160
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 420	£ 450	£ 480	£ 520	£ 560	£ 600	£ 640	£ 680	£ 760	£ 840	£ 960	£ 1080	£ 1200

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cylinder	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
Revolutions per Minute	120	100	80	60	50	40	30	24	20	16	12	10	8
Price of Engine with Condenser	£ 180	£ 210	£ 240	£ 280	£ 320	£ 360	£ 400	£ 440	£ 520	£ 600	£ 720	£ 840	£ 960
Price of Engine with Condenser and Fly-wheel	£ 220	£ 250	£ 280	£ 320	£ 360	£ 400	£ 440	£ 480	£ 560	£ 640	£ 760	£ 880	£ 1000
Price of Engine with Condenser and Fly-wheel and Link Motion	£ 260	£ 290	£ 320	£ 360	£ 400	£ 440	£ 480	£ 520	£ 600	£ 680	£ 800	£ 920	£ 1040
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 300	£ 330	£ 360	£ 400	£ 440	£ 480	£ 520	£ 560	£ 640	£ 720	£ 840	£ 960	£ 1080
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 340	£ 370	£ 400	£ 440	£ 480	£ 520	£ 560	£ 600	£ 680	£ 760	£ 880	£ 1000	£ 1120
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 380	£ 410	£ 440	£ 480	£ 520	£ 560	£ 600	£ 640	£ 720	£ 800	£ 920	£ 1040	£ 1160
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 420	£ 450	£ 480	£ 520	£ 560	£ 600	£ 640	£ 680	£ 760	£ 840	£ 960	£ 1080	£ 1200

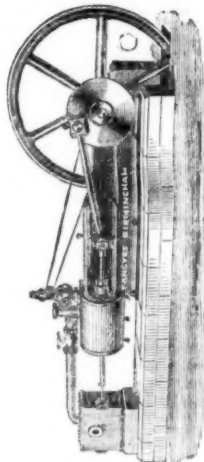
TANGYES' HORIZONTAL STEAM ENGINE.
COUPLED, WITH PATENT GOVERNOR.



These Engines are precisely the same in design as the foregoing, and being so fitted and arranged for many purposes, with great advantage, for use in the Cornwalls, where they are supplied with Stop Valve to each Engine, but separate Governor, as illustrated, can be supplied at an extra price if ordered. The fly wheel is in halves, and fitted with turned Bolts.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cyls.	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
Revolutions per Min.	120	100	80	60	50	40	30	24	20	16	12	10	8
Price per Pair	£ 360	£ 420	£ 480	£ 540	£ 600	£ 660	£ 720	£ 780	£ 900	£ 1020	£ 1200	£ 1440	£ 1680
Price of Pair with Condenser	£ 420	£ 480	£ 540	£ 600	£ 660	£ 720	£ 780	£ 840	£ 960	£ 1080	£ 1260	£ 1500	£ 1740
Price of Pair with Condenser and Fly-wheel	£ 480	£ 540	£ 600	£ 660	£ 720	£ 780	£ 840	£ 900	£ 1020	£ 1140	£ 1320	£ 1560	£ 1800
Price of Pair with Condenser and Fly-wheel and Link Motion	£ 540	£ 600	£ 660	£ 720	£ 780	£ 840	£ 900	£ 960	£ 1080	£ 1200	£ 1380	£ 1620	£ 1860
Price of Pair with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 600	£ 660	£ 720	£ 780	£ 840	£ 900	£ 960	£ 1020	£ 1140	£ 1260	£ 1440	£ 1680	£ 1920
Price of Pair with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 660	£ 720	£ 780	£ 840	£ 900	£ 960	£ 1020	£ 1080	£ 1200	£ 1320	£ 1500	£ 1740	£ 1980
Price of Pair with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 720	£ 780	£ 840	£ 900	£ 960	£ 1020	£ 1080	£ 1140	£ 1260	£ 1380	£ 1560	£ 1800	£ 2040
Price of Pair with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 780	£ 840	£ 900	£ 960	£ 1020	£ 1080	£ 1140	£ 1200	£ 1320	£ 1440	£ 1620	£ 1860	£ 2100

TANGYES' HORIZONTAL CONDENSING STEAM ENGINE.
WITH PATENT GOVERNOR.

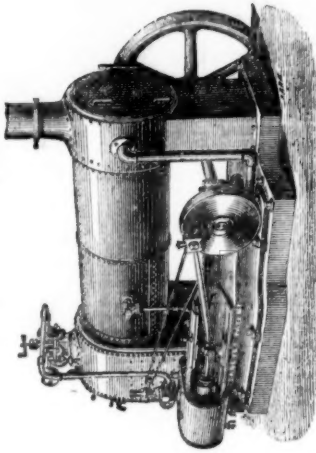


The Illustration shows the "Tangyes" Steam Engine, combined with Horizontal Air Pump Condenser. The Condenser is fitted with a three-way Valve, to allow exhaust steam to be easily diverted into atmosphere, and for facilitating starting.

The speed of the engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cylinder	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
Revolutions per Minute	120	100	80	60	50	40	30	24	20	16	12	10	8
Price of Engine with Condenser	£ 180	£ 210	£ 240	£ 280	£ 320	£ 360	£ 400	£ 440	£ 520	£ 600	£ 720	£ 840	£ 960
Price of Engine with Condenser and Fly-wheel	£ 220	£ 250	£ 280	£ 320	£ 360	£ 400	£ 440	£ 480	£ 560	£ 640	£ 760	£ 880	£ 1000
Price of Engine with Condenser and Fly-wheel and Link Motion	£ 260	£ 290	£ 320	£ 360	£ 400	£ 440	£ 480	£ 520	£ 600	£ 680	£ 800	£ 920	£ 1040
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 300	£ 330	£ 360	£ 400	£ 440	£ 480	£ 520	£ 560	£ 640	£ 720	£ 840	£ 960	£ 1080
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 340	£ 370	£ 400	£ 440	£ 480	£ 520	£ 560	£ 600	£ 680	£ 760	£ 880	£ 1000	£ 1120
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 380	£ 410	£ 440	£ 480	£ 520	£ 560	£ 600	£ 640	£ 720	£ 800	£ 920	£ 1040	£ 1160
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 420	£ 450	£ 480	£ 520	£ 560	£ 600	£ 640	£ 680	£ 760	£ 840	£ 960	£ 1080	£ 1200

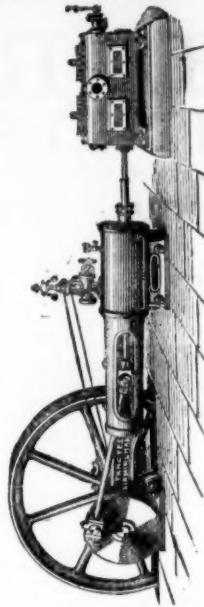
TANGYES' HORIZONTAL STEAM ENGINE
AND MULTITUBULAR BOILER.
WITH PATENT GOVERNOR.



This Illustration shows a combination of the "Tangyes" Steam Engine, and Multitubular Boiler, mounted on a strong cast iron base. Feed Pump included in price.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cylinder	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
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Price of Engine with Condenser	£ 180	£ 210	£ 240	£ 280	£ 320	£ 360	£ 400	£ 440	£ 520	£ 600	£ 720	£ 840	£ 960
Price of Engine with Condenser and Fly-wheel	£ 220	£ 250	£ 280	£ 320	£ 360	£ 400	£ 440	£ 480	£ 560	£ 640	£ 760	£ 880	£ 1000
Price of Engine with Condenser and Fly-wheel and Link Motion	£ 260	£ 290	£ 320	£ 360	£ 400	£ 440	£ 480	£ 520	£ 600	£ 680	£ 800	£ 920	£ 1040
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 300	£ 330	£ 360	£ 400	£ 440	£ 480	£ 520	£ 560	£ 640	£ 720	£ 840	£ 960	£ 1080
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 340	£ 370	£ 400	£ 440	£ 480	£ 520	£ 560	£ 600	£ 680	£ 760	£ 880	£ 1000	£ 1120
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 380	£ 410	£ 440	£ 480	£ 520	£ 560	£ 600	£ 640	£ 720	£ 800	£ 920	£ 1040	£ 1160
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 420	£ 450	£ 480	£ 520	£ 560	£ 600	£ 640	£ 680	£ 760	£ 840	£ 960	£ 1080	£ 1200

TANGYES' HIGH-PRESSURE
CONDENSING STEAM ENGINE,
WITH PATENT GOVERNOR.



This Engine is that described as "Tangyes' High-pressure Steam Engine," with Horizontal Air Pump Condenser attached.

The Air Pump is double acting, and so arranged with the Condenser that the piston always works in water free from air spaces for vapour to expand in.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M
Nominal Horse-power	4	5	6	8	10	12	14	16	20	24	30	40	50
Diam. Steam Cylinder	10	12	14	16	18	20	22	24	28	32	36	42	48
Length Stroke	18	20	22	24	26	28	30	32	36	40	44	52	60
Revolutions per Minute	120	100	80	60	50	40	30	24	20	16	12	10	8
Price of Engine with Condenser	£ 180	£ 210	£ 240	£ 280	£ 320	£ 360	£ 400	£ 440	£ 520	£ 600	£ 720	£ 840	£ 960
Price of Engine with Condenser and Fly-wheel	£ 220	£ 250	£ 280	£ 320	£ 360	£ 400	£ 440	£ 480	£ 560	£ 640	£ 760	£ 880	£ 1000
Price of Engine with Condenser and Fly-wheel and Link Motion	£ 260	£ 290	£ 320	£ 360	£ 400	£ 440	£ 480	£ 520	£ 600	£ 680	£ 800	£ 920	£ 1040
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear	£ 300	£ 330	£ 360	£ 400	£ 440	£ 480	£ 520	£ 560	£ 640	£ 720	£ 840	£ 960	£ 1080
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve	£ 340	£ 370	£ 400	£ 440	£ 480	£ 520	£ 560	£ 600	£ 680	£ 760	£ 880	£ 1000	£ 1120
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump	£ 380	£ 410	£ 440	£ 480	£ 520	£ 560	£ 600	£ 640	£ 720	£ 800	£ 920	£ 1040	£ 1160
Price of Engine with Condenser and Fly-wheel and Link Motion and Reversing Gear and Exhaust Valve and Feed Pump and Fly-wheel	£ 420	£ 450	£ 480	£ 520	£ 560	£ 600	£ 640	£ 680	£ 760	£ 840	£ 960	£ 1080	£ 1200

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THE BLAKE-MARSDEN NEW PATENT IMPROVED STONE BREAKERS AND ORE CRUSHERS.

ORIGINAL PATENTEE
AND ONLY MAKERALSO PATENTEE AND ONLY
MAKER OF THE**H. R. MARSDEN,**
NEW PATENT FINE CRUSHER OR PULVERIZER,

FOR REDUCING TO AN IMPALPABLE POWDER, OR ANY DEGREE OF FINENESS REQUIRED.

GOLD QUARTZ, SILVER, COPPER, TIN, ZINC, LEAD,

AND ORES OF EVERY DESCRIPTION

PATENT REVERSIBLE CUBING and CRUSHING
JAWS, IN FOUR SECTIONS,
WITH PATENT FACED BACKS, REQUIRING
NO WHITE METAL IN FIXING.CRUCIBLE CAST-STEEL CONNECTING RODS.
RENEWABLE TOGGLE CUSHIONS, &c.**OVER 4000 IN USE.**EXTRACTS FROM TESTIMONIALS.
PULVERIZER.

"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone and bring it out like flour."

"In reply to your favour, I have much pleasure in informing you that the 12x3 Pulverizer we had from you is giving us every satisfaction. The material we are operating on is an exceptionally hard one. I am well satisfied with its working."

"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

"The reports from our mines as regards the working of your Fine Crusher (20x5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried by hand, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

"As I once before stated, your machine is a perfect pulverizer."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

AWARDED OVER

60

FIRST-CLASS GOLD AND SILVER MEDALS.

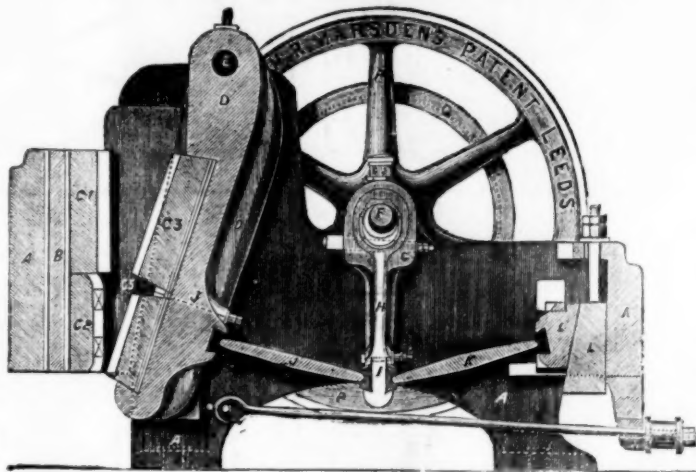
ADOPTED BY THE PRINCIPAL CORPORATIONS, CONTRACTORS, MINING COMPANIES, &c., IN ALL PARTS OF THE WORLD.

ROAD METAL BROKEN EQUAL TO HAND, AT ONE-TENTH THE COST.

EXTRACTS FROM TESTIMONIALS.—STONEBREAKER.

"I now order Three of your Stone Crushers, size 15 x 10, to be of your very best construction, and to include two extra sets of Jaws and Cheeks for each. The last two 24x13 machines you sent me, which are at work in this colony, are doing very well. You will soon find that the railway contractors will adopt your machines in preference to the colonial ones—two of which I have. I know other contractors have had as many as nine of them, which have not given very good satisfaction. Once they know of yours thoroughly, I believe you will do a good trade with the colonies. For reference of the high character of your constructions you can refer to me as having used them with the very best results, both in New Zealand and this colony, and much prefer them to the colonial article, both in point of construction and less liability to go out of order. The material we are crushing is very hard blue stone, for railway ballast purposes. Push on with the order as quickly as possible. I do not think it necessary to have any engineering inspection. I have brought your machines prominently under the notice of all large contractors in this colony, likewise the Government. Many of the contractors have spoken to me in reference to their capabilities, and I could only tell them that they are by far and away the best and most economical I ever used. The very fact of me having purchased now Eleven from you at various intervals and various sizes, and two above 12 years ago, and having tried all the other makers, is sufficient guarantee of the capabilities and the working of your machines. Yours in every way surpass all others."

"Some of your testimonials do not give your machines half their due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin capels (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."



GREATLY REDUCED PRICES ON APPLICATION.

FOR CATALOGUES, TESTIMONIALS, &c., APPLY TO THE SOLE MAKER,

H. R. MARSDEN, SOHO FOUNDRY, LEEDS.**JOHN CAMERON'S**

FLY-WHEELS ON BOTH SIDES.

STEAM PUMPS
FOR
COLLIERY PURPOSES.

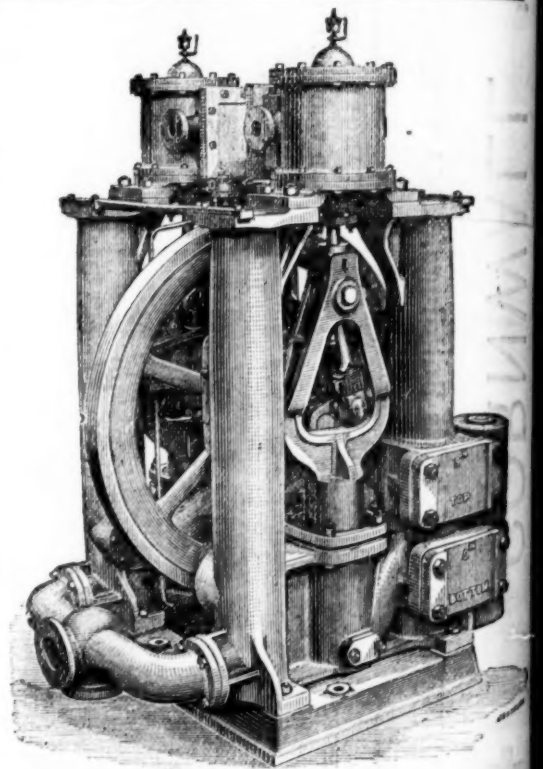
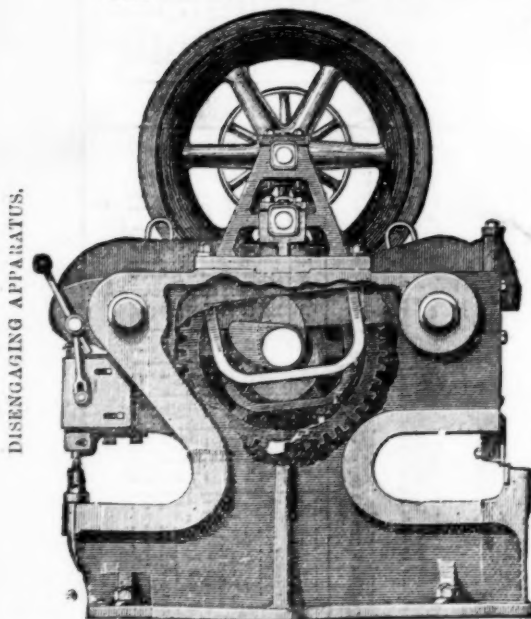
Specially adapted for forcing Water any height

ALSO, FOR

**SINKING, FEEDING BOILERS AND STEAM
FIRE ENGINES,**

Of which he has made over 9000.

ALSO, HIS

**PATENT CAM AND LEVER
PUNCHING AND SHEARING MACHINES.****Works: Oldfield Road, Salford,
Manchester.**AGENTS { For LONDON and DISTRICT—PRICE and BELSHAM,
52, QUEEN VICTORIA STREET, E.C.
For NEWCASTLE and EAST COAST—E. BECKWITH AND CO.,
BONNERSFIELD, SUNDERLAND.

By a special method of preparation this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

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LEATHER MILL BAND AND HOSE PIPE MANUFACTURERS,
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BOILER TUBES**

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Lapwelded & Buttwelded Wrought-iron, Steel, or Homogeneous Tubes
FOR EVERY
COLLIERY OR MINING PURPOSE.**J. WOOD ASTON AND CO., STOURBRIDGE**

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FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,
RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Uae Iron of all descriptions

WELDED STEEL CHAINS { FOR CRANES, INCLINES, MINES, &c.,
MADE ALL SIZES.